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I.—ÆSTHETIC EVOLUTION IN MAN.

ALL the higher processes of evolution are necessarily so complex in character that we can really deal with only a single aspect at a time. Hence, in spite of the rather general title which this paper bears, it proposes to treat of æsthetic evolution in man under one such aspect only—that of its gradual decentralisation, its increase in disinterestedness from the simple and narrow feelings of the savage or the child to the full and expansive æsthetic catholicity of the cultivated adult. We have to trace the progress of the sense of beauty from its first starting-point in the primitive sensibilities of the race or the individual to its highest development in the most refined and advanced of European artists.

To do so, we must first find this starting-point itself. What is the centre from which the widening circle of æsthetic sensibility takes its departure? In other words, what is the primitive source of the appreciation of beauty? Putting the question into a concrete form, what objects did man, as a whole, and does each man in particular, first find beautiful? If we look at a cultivated European, we see that he derives great æsthetic enjoyment from contemplating the sunset clouds, the green trees, the lakes, rivers, and waterfalls, the flowers, birds, and insects around him. But if we look at a savage or a child, we see that for the most part they care for none of these things. We might almost conclude, on a hurried glance, that they had

no sense of beauty whatsoever. Yet, when we examine them a little more closely, we find that there are many objects to which they do apply some such word as *pretty*, the symbol of the simplest æsthetic appreciation. If we can discover the limitations of these earliest æsthetic objects, we shall have solved one of the most important fundamental problems in the theory of beauty.

The settlement of such fundamental problems seems to me an indispensable preliminary to the construction of a scientific doctrine of æsthetics. When professors of fine art discuss the principles of beauty, they are too fond of confining themselves to the very highest feelings of the most cultivated classes in the most civilised nations. The mere childish love of colours, the mere savage taste for bone necklets and carved calabashes, seem beneath their exalted notice. Nay, more, we constantly find them accusing one another of having no feeling for beauty, or at least very little. Thus we see Mr. Ruskin and Mr. Poynter each mutually denying the other's powers of appreciation. But the psychological æsthetician cannot confine his attention to such exceptional and highest developments of the love for beauty as engage the whole interest of these artistic critics. He must look rather to those simpler and more universal feelings which are common to all the race, and which form the groundwork for every higher mode of æsthetic sensibility. It is enough for him that all village children call a daisy or a primrose pretty: he need not go far afield to discuss the peculiar specific merits of a Botticelli or a Pinturicchio. Hundreds of thousands, who would stare in blank unconcern at a torso from the chisel of Pheidias, can love and admire "the meanest flower that blows," with something not wholly unlike the welling emotions of a Wordsworth. Indeed, one is often inclined to fancy that the truest lovers of beauty in nature, or in the works of man, are not always those who can talk most glibly the technical dialect of art-criticism.

If we wish to hit upon the primitive germ of æsthetic sensibility in man, we cannot begin better than by looking at its foreshadowing in the lower animals. There are two modes of æsthetic feeling which seem to exist amongst vertebrates and insects at least: the first is the sense of *visual beauty* in form, colour, or brilliancy; the second is the sense of *auditory beauty* in musical or rhythmical sound. The former of the two modes I have endeavoured in part to illustrate in my little work *The Colour-Sense*: the latter has been admirably treated by Mr. Sully in his valuable essay on "Animal Music," which appeared in the *Cornhill Magazine* for November, 1879. Now if we look at the manner in which insects, birds, and mammals apparently

manifest these presumed aesthetic feelings, we shall see that they are very restricted and limited in range. Animals never seem to admire scenery, or foliage, or beautiful creatures of other species. They do not appear for the most part to care greatly for human music, or for any sounds other than those uttered by their own kind. They do not even show any marked aesthetic enjoyment of the lovely flowers and fruits whose tints, as Mr. Darwin teaches us, are mainly due to their own selective action. But, if our great biologist is correct in his reasonings,¹ they *do* very distinctly display their admiration for the beautiful forms, colours, and songs of their own highly decorated or musical mates. The facts on which Mr. Darwin bases his theory of sexual selection thus become of the first importance for the aesthetic philosopher, because they are really the only solid evidence for the existence of a love for beauty in the infra-human world. Granting the truth of his views (on which I for one have no shadow of doubt now remaining), we have good proof of a taste for symmetry and curved form in the magnificent tail of the lyre-bird, in the wedding plumage of the whydah-bird, in the twisted horns of the kudu antelope; of a taste for colour and lustre in the gorgeous train of the peacock, in the metallic necklets of the humming-bird, in the exquisite wings of tropical butterflies, in the bronze and gilded armour of the rose-chafers; lastly, of a taste for musical sound in the stridulation of the cicada and the house-cricket, in the deep notes of the bell-bird and the howler monkey, in the outpoured song of the linnet, the sky-lark, and the nightingale.

This close restriction of the aesthetic feeling to those objects which most nearly concern the individual, and through him the species, is only what we should naturally expect amongst the lower animals. We could hardly fancy them interesting themselves in anything so remote from their own personal wants as the rainbow or the sunset, the blue hills and the belted sea.

¹ I should like to add parenthetically that since the appearance of my work *The Colour-Sense*, and the numerous criticisms to which it gave rise, I have fully reconsidered the whole question of sexual selection in the light of all that has been written about it, and feel only the more convinced of the general truth of Mr. Darwin's views upon the subject. It may be naturally objected that I am not an impartial witness in this matter: but I should like further to state that, on examining the various authorities, *pro* and *con*, I find in every case that the persons who are uncommitted to any special theological, quasi-theological or metaphysical theory of evolution agree in full with Mr. Darwin, while only those differ from him who are bound down, *en parti pris*, to some more or less supernatural view of evolution, like Mr. Wallace, Professor Mivart, and Mr. J. J. Murphy, and who are therefore averse to any naturalistic explanation of the sense of beauty. I hope hereafter and elsewhere to enter more fully into this important question.

They and their ancestors before them could not have gained any advantage by turning aside their attention from the practical pursuit of food or mates, to the otiose contemplation of that which profiteth nothing. Our own disinterested love for things so distant from our substantial needs, has arisen gradually through a long process of ever widening sympathies and ever multiplying associations. But two things the insect, the bird, or the mammal could notice, and gain an advantage for itself or its race by noticing. It could pick out by its eye the forms and colours of edible foodstuffs among the unedible and relatively useless mass of foliage upon earth—the red berry or blossom from the green leaves, the fat white grub from the brown soil, the lurking caterpillar from the stalk whose lines and hues it so exactly imitates. It could distinguish by its ear the chirp of the savoury grasshopper from the click of the hard or bitter beetle, the pretty note of the harmless sparrow from the deep cry of the dangerous hawk or the greedy jay. Thus eye and ear alike became educated amongst the superior articulates and vertebrates, in anticipation, as it were, of their higher aesthetic functions.

In the choice of mates, however, the powers so gained were exercised in a way which we cannot consider as falling short of the true aesthetic level. Even the lowest animals (amongst those in which the sexes are different) seem instinctively to distinguish their fellows from all other species. In the higher classes, where the eye and ear have been so educated as to discriminate minutely between various forms, colours, shades, and notes, the instinct must almost certainly operate through the senses of sight and hearing. Even amongst those races of insects, birds, and mammals in which no distinct marks of sexual selection exist, I believe the sight of beautiful members of their own kind must necessarily excite pleasurable feelings worthy of being ranked in the aesthetic class. In other words, I believe every crow must think its own mate *beautiful*. Not merely inferentially pleasant, but in the truest sense beautiful. There must be, it seems to me, such an intimate correspondence between the needs and the tastes of each species, that the sight and voice of a healthy, normal, well-formed mate must have become intrinsically pleasing for its own sake, as well as indirectly for its associations. The nervous centres of each species must, I conceive, be so constructed hereditarily as to answer congenitally to certain typical shapes and sounds often experienced ancestrally, and always with ultimate benefit to the race. Though the emotions require experience of the object to arouse them, when the object occurs the emotions naturally arise. Just as man has special cerebral structures—existing,

though dormant, even in deaf-mutes—for the perception and production of human language, so, I cannot but believe, every species of higher animal has special cerebral structures, with special corresponding blank forms of perception, for the intellectual recognition and appropriate emotional reception of its fellows and its mates. These feelings are innate in the sense that they occur spontaneously at sight of the proper objects. When Miranda falls in love at first sight with Ferdinand, the only young man she has ever seen, it seems to me that the poet has truly depicted a genuine psychological fact. At any rate, it is indubitable that, so far as man is concerned, the human voice has certain points of emotional and technical superiority over every other kind of musical instrument, and that the beauty of woman and of the human form is now and must always remain the central standard of beauty for all humanity.

The heart and core of such a fixed hereditary taste for each species must consist in the appreciation of the pure and healthy typical specific form. The ugly for every kind, in its own eyes, must always be (in the main) the deformed, the aberrant, the weakly, the unnatural, the impotent. The beautiful for every kind must similarly be (in the main) the healthy, the normal, the strong, the perfect, and the parentally sound.¹ Were it ever otherwise—did any race or kind ever habitually prefer the morbid to the sound, that race or kind must be on the high-road to extinction. The more every individual shares the healthiest tastes of its kind, and puts them in practice in the choice of a mate, the more is he or she ensuring for descendants a healthy and a successful life whereby it hands on its own sound taste to future generations. But, besides this fundamental typical beauty—the beauty which consists in full realisation of the normal specific form—there is another source of personal beauty on which sexual selection may act, and through which it has produced the greater number of its most striking effects. This source may be found in the exercise of tastes otherwise acquired upon relatively unimportant details of form, colour, or musical abilities. The taste for bright hues, acquired through the search for food in blossoms, berries, or brilliant insects, may be transferred to the search for mates, so that those mates will be most preferred which happen to vary most from the original typical colouration in the direction of more brilliant hues. The taste for musical sound, implied, as I have elsewhere

¹ This doctrine has been admirably illustrated by Mr. Herbert Spencer so far as regards the human species, in his essay on "Personal Beauty," which, though published long before the appearance of the *Descent of Man*, really contains the germ of the doctrine of sexual selection.

tried to show on the lines laid down by Helmholtz, in the very structure of the auditory apparatus (at least in birds and mammals), may be exercised in the preference given among birds to the sweetest or the loudest singers. Unimportant ornamental points may thus be constantly developed by continual selection of small gradations, when they do not interfere with the general efficiency of the organism, till at length we get such highly evolved æsthetic products as the waving plumage of the bird-of-paradise, the sculptured antlers of the gazelle, and the varied song of the mocking-bird. And since, as Mr. Wallace has shown (he himself believes in opposition to, but I rather fancy in confirmation of, Mr. Darwin's theory), these ornamental adjuncts or faculties are most likely to coexist with the highest sexual efficiency, it must happen that in the main sexual selection and natural selection will reinforce one another, the strongest and best being always on an average the most beautiful, and hence the most pleasing to all possible mates.

In this way, I take it, a sense of beauty in the contemplation of their own mates must have grown up amongst all the higher animals, and must have become strongest and most discriminative amongst those whose mates have undergone the greatest amount of ornamental differentiation. And as the secondary differences between man and woman as to beard, hair, and features, are greater than between the two sexes of almost any other quadrumanous animal, we may conclude that man's æsthetic appreciation of beauty in his own species has always been very considerable. Of this æsthetic appreciation, the secondary differences in question are at once the proof, the cause, and the effect. For in the constant action and reaction of heredity and adaptation, it must happen that the greater the original taste, the more will it be exerted in the choice of mates, and the more it is exerted in each generation, the greater will be its effects, and the more will the taste be strengthened in all future generations.

This, then, would seem to be the primitive starting-point of which we are in search. Man in his earliest human condition, as he first evolved from the undifferentiated anthropoidal stage, must have possessed certain vague elements of æsthetic feeling: but they can have been exerted or risen into conscious prominence only, it would seem, in the relation of primæval courtship and wedlock. He must have been already endowed with a sense of beauty in form and symmetry, a sense which, in spite of its wide expansion and generalisation in subsequent ages, still attaches itself above every other object, even with Hellenic or modern sculptors, to the human face and figure. He must also have been sensible to the beauty of colour and lustre,

rendered faintly conscious in the case of flowers, fruits, and feathers, but probably attaining its fullest measure only in the eyes, hair, teeth, lips, and glossy black complexion of his early mates. And he must have been moved, as Mr. Darwin argues, by musical tones and combinations, though chiefly in the form of human song or rhythm alone. In short, the primitive human conception of beauty must, I believe, have been purely *anthropinistic*—must have gathered mainly around the personality of man or woman; and all its subsequent history must be that of an *apanthropinisation* (I apologise for the ugly but convenient word), a gradual regression or concentric widening of æsthetic feeling around this fixed point which remains to the very last its natural centre. By the common consent of poets, painters, sculptors, and the world at large, the standard of beauty for mankind is still to be found in the features and figure of a lovely woman.

Probably primitive man admired his pre-glacial Phyllis or Neæra, admired himself, and perhaps also admired his fellow-man. So far as I can learn, there are no savages so low that they do not discriminate between pretty squaws or gins and plain ones, between handsome men and ugly ones. Our own children appear to me to make the distinction amongst their playmates from a very early age. And in both cases, I am satisfied that their judgment in the main agrees with our own.¹ But it does not seem likely that primitive man took much notice of scenery, of organic beauty as a whole, or even very largely of beauty in flowers, berries, butterflies, and shells. Yet there was an obvious link, a simple stepping-stone, by which nascent æsthetic feeling might easily pass from the one stage to the other. That link is given us in the love for personal decoration.

Not only does every unsophisticated man wish to find a pretty mate, but he also wishes to look to advantage in her eyes and those of his rivals. Similarly, every woman wishes to look pleasing towards all men. The most naked savages take immense pains with their fantastic *coiffures*. Even birds display their beauty to the best advantage, and sing in emulation with one another till their strength fails them. But birds and mammals generally go no farther than this: man can take one step in advance, and add to his natural beauty, or conceal his natural defects, by borrowed plumes. So the earliest evidence

¹ I noticed in Jamaica that the negroes generally considered as pretty negresses the same women as we should ourselves have selected among them: and many persons who have travelled amongst various savage races, and whom I have had an opportunity of questioning, confirm this general conclusion.

of derivative aesthetic feeling which we possess is that of the personal ornaments worn by palæolithic men. Perforated shells, apparently used for necklaces; teeth of deer and other animals; pebbles of rose-quartz and other ornamental stones; wrought pieces of bone or mammoth ivory,—all of them obviously intended for personal decoration—are found in the earliest cave-dwellings and rock-shelters. Feathers and flowers we cannot of course expect to find in such situations; but we can hardly doubt, from the analogy of almost all modern savages, that palæolithic men must have used them as much as they used those other decorative objects. Now, the fact that any such shells or plumes are sought as ornaments proves of course that they were first admired: but the vague admiration originally bestowed upon them would naturally be much quickened and increased by their employment for the decoration of the person. From being vague and indefinite it would become vivid and purposive. Our own children and modern savages take comparatively little interest in flowers in the abstract, flowers as they grow upon the bush or in the field: but they begin to admire them when they pick them by handfuls, and still more when they are woven into a wreath, arranged in a bouquet, or stuck into the hair. Nay, is not this ultimate decorative intent one of the chief *raisons d'être* for many of our European conservatories and florists' shops? Is not a camellia largely admired because it looks so well in a ball-dress, and a stephanotis because it fits so easily in a button-hole? And is it not a fact that many of our ladies and most of our servants admire artificial flowers, with all their stiffness and vulgarity, far more genuinely than they admire living roses or lilies of the valley? We have all known women whose most real aesthetic feelings were obviously aroused by a bonnet or a head-dress.

Flowers are very favourite decorations with the South Sea Islanders, and those who have read Miss Bird's and Mrs. Brassey's pleasant accounts of their stay amongst the Polynesians must have noticed the air of refinement, the vague aesthetic atmosphere thrown over the whole story by their profuse employment of tropical blossoms upon all occasions. Feathers, symmetrically arranged, were the ordinary head-dress of the North American Indians: and they were woven into splendid cloaks by the Hawaiians. Corals, pebbles, precious stones, gold and silver jewellery, cowries, wampum beads, furs, silks, and so forth, follow in due order. Ochre and woad, for dyeing or staining the body, are employed from a very early period. Henna, indigo, and other cosmetics come a little later. Among many existing lowest races, the only sign of aesthetic feeling, beyond the sense of personal beauty and the very rudest songs

or dances, is shown in the employment of dyes or ornaments for the person. Such are many of the Indian Hill Tribes, the Andamanese, the Digger Indians of California, and the Botocudos of Brazil. The Bushmen and to a less extent the Australians, generally ranked in the lowest order, reach a decidedly higher æsthetic level.

In most savage communities, the men, not the women, monopolise the handsomest costumes, which are worn as marks of distinction, not merely as ornaments. But the former use must be necessarily derivative and secondary, not original. Mr. Herbert Spencer has gathered together a large and interesting collection of cases in his *Ceremonial Institutions* (chap. ix.). Nevertheless, the original æsthetic intent of most of such decorations is obvious from the fact that they are universal amongst women, whenever they do not arise from the habit of trophy-taking, as with the use of flowers by the Polynesians generally. So, too, tattooing and other mutilative practices, originally subordinative in their intention, becoming at last merely æsthetic, are prized by women as increasing their natural attractions. Everyone must remember the plea of the New Zealand girls, quoted by Mr. Darwin, who answered the remonstrances of the missionary against tattooing by saying, "We must have just a few lines upon our lips, or else when we grow old we shall be so very ugly". Similarly, Central African women admire their own *pelelé*, the piece of wood inserted in their mutilated lips. I notice in many works of travel that even where the men almost or entirely monopolise the ornaments, the women are always described as displaying great admiration for the beads, red cloth, and other finery taken about by travellers. I may add that I am often struck by the extraordinary folly of missionaries, who habitually preach down the love of ornament on the part of savages or of emancipated slaves (especially the women), when in reality this love is the first step in æsthetic progress, and the one possible civilising element in their otherwise purely animal lives.¹ It ought rather to be used as a lever, by first making them take a pride in their dress, and then passing on the feeling so acquired to their children, their huts, their gardens, and their other belongings.

Such in fact has been, I believe, the actual course of our æsthetic evolution. The feelings vaguely aroused by beautiful

¹ I once asked a West Indian official of great experience and liberal views whether, in his opinion, Christianity had done any practical good to the negroes; and I was much struck by his answering: "Oh yes! It makes them dress up in good clothes once a week, and so gives them an object in life for which to work and save."

objects in the non-practical environment become whetted and strengthened by exercise upon ornaments and pigments, and so extend themselves with increased vividness into new channels. Art, however rude, has especially helped on this primitive progress. The appreciation for the beautiful in man's handi-craft leads on to the appreciation of the corresponding beauty in natural objects. I have attempted to trace this reaction, so far as regards the sense of symmetry, in a previous number of this journal,¹ and I shall endeavour still further in the present paper to illustrate its progress in a somewhat different direction.

From delight in the beauty of ornaments to delight in the beauty of weapons or other utensils is but a step. What a man carries in his hands is almost as much a matter for personal pride as what he wears around his neck or his waist. From the very earliest ages, the material for palaeolithic stone hatchets seems to have been intentionally chosen with conscious reference to beauty of colour. Amongst the minerals so employed were "red or other coloured jasper"; "greenstone, mottled jade, and green jasper"; "quartz, agate, flint, obsidian, fibrolite, chloromelanite, aphanite, diorite, saussurite, and stau-rotide". The bone knife-handles and other utensils from the rock-shelters of the Dordogne (of palæolithic date) are admirably carved into the forms of animals, or decorated with ornamental patterns. Indeed, both in outline and detail, most works of art of the chipped flint period show very distinct æsthetic care, which is often marvellous when one considers the extremely rude nature of the tools in use, and the immense extra labour entailed upon the maker by any attempt at unnecessary ornamentation. The weapons of all but the very lowest existing savages show similar marks of æsthetic care. Their stone hatchets, besides being exquisitely polished, like those of the European neolithic age, are fitted in smooth wooden handles, and bound to the shaft by pretty twisted strings of red and yellow fibre. The Australian boomerangs are beautifully worked in hard wood. The staves or clubs of the Admiralty Island chiefs are wrought with the most exquisite and laborious tracery, which puts to shame our careless European wood-carving. The canoe paddles of other Polynesian and Melanesian tribes are models of graceful and effective ornamentation. Among many savages belonging to the second rank, I find few works of art except weapons or like personal utensils on which any high degree of pains has been expended. We may therefore fairly regard this as the second human stage of æsthetic development.

¹ See an article on "The Origin of the Sense of Symmetry," in MIND XV.

Hardly superior to this second level is the love for decoration on vessels and other domestic utensils. Yet these, as being just one degree less personal than weapons, may be regarded as occupying a slightly higher stage. Calabashes and cocoa-nuts are almost always carved or decorated. Pottery from the very first is more or less ornamental in form, and even amongst very undeveloped savages is often prettily moulded with lines or string-courses. Many of Dr. Schweinfurth's Central African specimens are extremely graceful; while several of the exquisitely simple prehistoric forms unearthed by Dr. Schliemann at Troy and Mycenæ have been adopted as effective models for the modern artistic Vallauris ware. France itself can produce nothing more beautiful in its own kind.

Decoration of the home is one degree more disinterested than decoration of the person or personal implements. The palaeolithic savages who carved the knife-handles and etched the pictures of rein-deer or mammoths in south-western France, still lived in caves and holes of the rock. But as soon as man began to dwell in a hut, that hut began to take the impress of his growing æsthetic tastes. Swiss lake-dwellings present regular square or circular ground-plans. Esquimaux snow-houses are finished with as much regularity and neatness as if they were built in the most durable material. Almost all savage huts are picturesque in shape, and some are even artistic in their simple style of architecture. The rudest tribes care for little but the exterior of their dwellings, since the interior is only used as a shelter for sleeping or a retreat from wet weather, not as a place of reception. Pride in personal possessions, we must always remember, has uniformly formed the stepping-stone on which our nature has slowly risen to a higher æsthetic level. So, we find houses beginning to be ornamented internally just in proportion as they are used for purposes of display. Even our own homes usually have the drawing and dining rooms much more elaborately decorated and furnished than the other parts of the house. The state-apartments of halls and palaces contain all the best pictures and the handsomest mosaic tables that their owners possess.

At this stage, the governmental and ecclesiastical impetus begins to be strongly felt. From the very beginning, indeed, æsthetic products are specially the attributes of royalty and divinity. The clubs and paddles noted above are those of chiefs alone: the Hawaiian feather mantles were *tabu* to the royal family: the ivory sceptre and the vermillion-painted face "belonged alike to the Roman god and to the Roman king". But when we reach a state of culture at which the royal palace and the temple are widely different from the huts of the subject,

we find a great æsthetic advance. Architecture is indeed a specially regal and religious art. All early buildings of any pretensions are either palaces or shrines: only at a comparatively late stage of evolution, and under an industrial régime, do handsome mansions of commoners begin to exist. Even in our own day, if we see an exceptionally large and pretentious house, we take it for granted that it is, if not a palace, at least a public building. In India, all the great architectural works are either mosques and temples or palaces and mausoleums of native or foreign rulers. In Egypt, they are either pyramids of dead kings or fanes of still earlier gods. So, too, in Mexico, Peru, Central America. The catalogue of the works of art in Solomon's temple and Solomon's house, whether authentic or not (and good authorities accept it as historical), represents at any rate the æsthetic status of the Hebrews at the date at which it was committed to writing.

The king, then, from the first surrounds himself with such natural or artistic products as add to his impressiveness and dignity. Trophies and other decorations of warlike origin, badges and costumes, paint and ointment, have been so fully treated in this connexion by Mr. Herbert Spencer in his *Ceremonial Institutions* that I need not dwell upon them further here. But a few words as to later and more developed stages may not be out of place. Architecture is the central royal art, and its first object is to "beautify the house of the king". Beginning with the regal hut, it goes on to the frail and gilded palaces of China and Burma, the house of cedar which King Solomon builded, the vast piles of brick erected by Assyrians and Babylonians in the alluvial valley of the Euphrates, the solid granite colonnades of Thebes and Memphis, the huge marble domes of Agra and Delhi, the stucco monstrosities of Mohammedan Lucknow. Sculpture first grows up as the handmaid of architecture, and begins its modern form with the bas-reliefs of Egypt and Assyria, or the rock-hewn colossi of Elephanta. We still see the conjunction between royalty and these two sister arts in the beautiful Renaissance façade of the Louvre and the tasteless gilding of the Albert Memorial. Beside the ancient Nile or in the courtyards of Nineveh, we find the subjects ever the same—the king conquering his enemies: the king hunting and slaying a lion: the king driving a herd of naked captives to his capital city. Thus the aggrandisement of royalty becomes at the same time the opportunity for the exercise and development of plastic skill, while it affords models of the beautiful in art for the admiration and the æsthetic education of the subject throng.

Similarly with painting. Beginning with the rude decoration

of the savage cloak and girdle, it advances to the smearing and gilding of the royal hut. Thence it progresses to the brilliant colouration of Egyptian columns and frescoes, and to all the Memphian wealth of blue, green, crimson, and gold with which so many modern restorations have made us familiar. In India, debarred from imitation by Moslem restrictions, it produces the exquisite decoration of the Taj and the Delhi palaces: in western Islam, it gives us the gorgeous Mauresque tracery of the Alhambra. In its regular European development, becoming mainly ecclesiastical during the early middle ages, it reasserts its original governmental connexion in the palaces of Florence and Venice, in the Vatican, in the Louvre and the Luxembourg, in Whitehall and Hampton Court, in Dresden and Munich, in modern Berlin and St. Petersburg. Sèvres and Gobelins were originally royal factories: Giotto, Michael Angelo, Raphael, Holbein, Rubens, Vandyke, all produced their masterpieces for popes or kings—Leo X., Henri IV., Charles I. Conversely, American artists have often noted the chilling effect of the want of a court upon the æsthetic susceptibilities and creativeness of their countrymen generally. Europe has, on the whole, purchased its art at the hard price of its long apprenticeship to despotism. In India, native art has steadily died out with the gradual extinction of the native courts. In Hellas and Italy it happily survived royalty because pressed into the double service of religion and of the sovereign people in its corporate capacity. What the house of Pharaoh was to Egypt, that was the house of Athene to Athens.

The gods, indeed, have done almost more for the expansion of the æsthetic faculty than even the kings. If the savage decorates the living chief and his house, how much more must he decorate and beautify the image and the house of that greater dead chief, the god—that ancestral ghost whom even the living chief dreads and venerates exceedingly. Hence, from the very first, while the ornaments of the king and the god are the same in kind, those of the god are the finest in degree. As the ghost gradually expands into the vaguer grandeur of the deity, his worship is surrounded with increasing magnificence. It is the temples of Heliopolis and Benares which naturally occur to our minds when we think of Egyptian or Indian architecture. It is the pyramids and mausoleums that form the initial stage of ecclesiastical buildings. All the world over, the shrines of the gods are the most splendid of all erections: only where faith is on the decline do we find the palace or the mansion outvying the cathedral and the chapel. In architecture, in sculpture, in painting, in music, the homes of the gods are the highest expression of national æsthetic feeling. Passing from the

painted pillars of Karnak to the temples of Khorsabad and the mosques of Agra, we find the same care everywhere bestowed upon the service of the deities. In Hellas, we have the Parthenon and the Theseum; we have the chryselephantine statues of Pheidias, and the votive tablets of Praxiteles. The marbles of Pentelicus or Paros permitted the Hellenic Aphrodite to assume a graceful and natural pose which would have been impossible with the stiff granite limbs of a Pasht carved out from the quarries of Syene. At Rome, we have the Capitoline Jove, yielding place at last to the palace of the Divus Cæsar and to the basilica of the Christian apostle. All classical architecture, all classical sculpture, the larger part of classical painting, and no small part of classical poetry, are directly due to the influence of the old Helleno-Italian religions. And whatever little information we can gather of the æsthetic status of the Hebrews is to be derived from the story of the hangings and vessels of the tabernacle, and the molten sea, the pillars, the bases, the lavers, and the cedar ceiling of Solomon's temple. Hebrew poetry is almost without exception devotional.

In Christian times, the connexion between art and religion has been even more noticeable. Our music is directly affiliated upon the Gregorian chant, and derives its notation from ecclesiastical usages. Masses and oratorios still compose its masterpieces. Our painting has come down to us from Byzantine and early Italian models, and found its home during the whole mediæval period in the great cathedrals and churches of Italy, whence it spread to the palaces of the Florentine Medici, of the Venetian doges, and of the Genoese merchant princes, and so ultimately to north-western Europe. The whole character of pictorial art up to the Renaissance was entirely ecclesiastical and devotional. We have fed and nursed our taste upon Madonnas and Holy Families, upon Crucifixions and Assumptions, upon St. Sebastians, St. Johns, and St. Cecilias. Our architecture is based upon the Romanesque Christian church, whose rounded forms melt into the pointed arches of the Gothic cathedral. It finds its noblest expression in Pisa and Poitiers, Milan and Venice, Cologne and Chartres, Lincoln and Salisbury. And when the classical revival comes to restore the older schools, it produces the masterpiece of its newer style in the vast dome of St. Peter's, where the four chief arts, architecture and sculpture, painting and music, all alike find their chosen home in the central point and focus of Catholic Christendom.

Nor is it only in these more notable forms that royalty and religion influence æsthetic taste. The purple and fine linen of king's palaces; the inlaid cabinets and parquetry floors; the jade vases and painted porcelain; the Dresden statuettes and

bronze candelabra ; the frescoed ceiling, tapestry wall-covers, and carved wood-work ; all these belong to the royal home. Even in poetry, the Queen still keeps her Laureate : and the drama, originally a sort of royal speciality, is still performed at Drury Lane by "Her Majesty's Servants". Similarly with religion: the stained glass window and the marble or mosaic altar; the costly vestments and sweet-perfumed incense ; the fretted roof and the sculptured reredos; these in their turn belong to the worship of God. Such royal decorations and sacred ornaments react again upon the popular taste, both actively and passively. As an active effect, they give rise to and foster artistic workmanship: as a passive effect, they educate and strengthen the æsthetic faculties of the mass. Amongst the lower races, the æsthetic feelings have been closely linked with the sense of proprietorship: amongst the higher races, they gain more and more with every step in abstractness and remoteness from the personality of the individual. It was in the vast cathedrals of mediæval Europe that modern æsthetic feeling received its early education.

So far we have treated little of beauty in nature: beauty in art has occupied almost our whole attention. The latter prepared the human mind for the appreciation of the former. Of the manner in which the love for art passes into the love for smaller natural objects, which exhibit minute beauty of workmanship, I have already treated elsewhere: but the taste for scenery demands a few words here. Children and early races care little for nature: it is only among the most cultivated classes of the most advanced types that the æsthetic faculty reaches this its highest and most disinterested stage. All art is at first frankly anthropinistic. Early painting, such as that of the Egyptians and Assyrians, dealt only with human and animal figures: it represented men and women, kings and queens, gods and goddesses, hunters and lions, herdsmen and cattle: but it never attempted landscape or scenery. Mediæval art in its early stages only changed its characters to saints and angels, priests and bishops. But as it progressed from its Byzantine type, it also gradually gave more and more importance to accessories in the back-ground, in which hills, cities, rocks, and trees, began to play a conspicuous part. At last, after the Renaissance, landscape painting became a recognised and separate branch of pictorial art, first with an admixture of figures, wild animals, or still life, but afterwards in a more fully differentiated form, with all its varieties of marine, architectural, forestine, or river subjects, its waterfalls, its clouds, its rocks, its valleys, and its heather-clad hills. Even in our own day, very young people and the uncultivated classes care little for any

but figure-painting : children pass over the landscapes in their picture-books, and fasten at once upon the man on horseback or the boy with a top. The first object they try to draw for themselves is a human face. So, too, with literature. All primæval literary works consist of a legend, a story historical or mythical, the tale of what some man or some god has done. To the very end, novels, plays, and biography, the most human in their interest, are the favourite forms of literature. Poetry at first is all epic or narrative : lyric and descriptive verse only come in at a much later point of evolution, and are seldom thoroughly relished by any but the most cultivated. "Tell me a story," says the youngest child : "History is the most delightful of studies," says the Roman philosopher.

We may take the Homeric poems as an excellent illustration of human æsthetic feeling in this its naïvely anthropinistic stage. In them we find human beauty abundantly recognised and admired. Helen, for whose sake Trojans and Achaians may well contend through ten long years ; Paris, on whose eyes and hair Aphrodite pours the gift of loveliness ; the golden locks of Achilles, the white arms of Here, the hazel eyes of Athene, the fair cheeks of Briseis. There is much admiration, too, for works of primitive art—the golden-studded sceptre, the polished silver-tipped bow of horn, the jewelled girdle of Aphrodite, the wrought figures on Achilles' shield, the embroidered pattern on the many-coloured peplum which Theanô offers on the knees of Athene. The palaces of Priam and of the Phœaciens excite the warmest praise of the rhapsodist. But of scenery there is little said, as is also the case in the Hebrew poets. The garden of Alcinous is, after all, but a well-ordered fruit-orchard. Nature is only alluded to as a difficulty to be overcome by man—the barren, harvestless sea ; the high, impassable mountains ; the forests where roam the savage wild beasts. In the Periclean age, we have a higher but still not a very exalted standard as regards natural beauty; the *Bacchae* of Euripides being the high-water mark of Athenian love for the picturesque, and standing out in this respect as a solitary example amongst its contemporaries. With the greater security of Roman rule, life became less confined to the immediate neighbourhood of cities ; mountains and forests and waterfalls became more easy to visit ; and in the *Georgics* we see the result of the change. Yet even in the *Georgics* the view of nature is still very anthropinistic, and the feeling for scenery decidedly urban. What should we say of a poet now-a-days who should apostrophise the beauties of an Italian lake "Fluctibus et fremitu assurgens, Benace, marino"? Would he not seem in our eyes to have missed entirely the whole spirit of the scene? The words might do for

Huron or Ontario, but fancy applying them to Como or Garda ! Nevertheless, the Roman mind had decidedly advanced in the love of nature. The Alps were still to Juvenal mere masses of snow barring the way from Gaul to Italy ; the ocean was still to Tacitus a boundless waste of western waters : but the falls of Tivoli, the little fountain-head of Bandusia, the sweeping coastline of Baiae, the beetling crags of Terracina, the deep volcanic basin of the Alban lake—all these could rouse aesthetic admiration and delight in the eyes of a Horace, a Virgil, or a Claudian. With the recession of the middle ages, when men were again confined to the narrow limits of towns, aesthetic feeling went back once more to the naïve anthropinism of an earlier age : but since the Renaissance, the love of scenery has grown perpetually, and it now probably reaches the furthest development that it has ever yet attained.

But we must never forget that the taste for scenery on a large scale is confined to comparatively few races, and comparatively few persons amongst them. Thus, to the Chinese, according to Captain Gill, in spite of their high artistic skill, "the beauties of nature have no charm, and in the most lovely scenery the houses are so placed that no enjoyment can be derived from it". The Hindus, "though devoted to art, care but little if at all for landscape or natural beauty". The Russians "run through Europe with their carriage windows shut". Even the Americans in many cases seem to care little for wild or beautiful scenery : they are more attracted by smiling landscape-gardening and, as it seems to us, flat or dull cultivation. I have heard an American just arrived in Europe go into unfeigned ecstasies over the fields and hedges in the flattest part of the Midlands.

The reason for this slow development may be briefly traced. The minor component elements of scenery must always have been to a great extent beautiful on their own account even to children and savages. Thus, the same bright colour which gave attractiveness to flowers and gems must also have given it, though more vaguely, to the rainbow and the sunset clouds, which could not similarly be utilised for purposes of ornament. Colour must also always have formed an element of beauty in blue sky and sea, red sandstone cliffs, white chalk, green meadows, and golden corn fields. All these objects, however, being comparatively remote from personal interest, would be little regarded by the primitive mind. But when cultivation began, the care of the husbandman and the aesthetic interest aroused by his regular neatness would naturally set up a new feeling. Straight rows of vines or olives, trim meadows, well-kept hedges, level fields of corn excite the farmer's admiration. This is about the level ordinarily reached (though often sur-

passed) by the *Georgics*. In the *Iliad*, when a place is mentioned with any allusion to scenery, it is generally because it is "fertile," "horse-feeding," or "rich in corn": with Virgil, it is the careful tillage of Italian peasants that provokes attention. But wild hills and rocks are mere barren good-for-nothing wastes to the agricultural eye. A few days before writing this paper I was wandering among the beautiful wooded heights of the Maurettes near Hyères, when I came across a party of peasants taking their lunch on a little plateau outside their cottage. Wishing to apologise for my intrusion, I said a few words about the singularly lovely view which their house commanded across the mountains and the sea. "Ah, yes," said one of the peasants in his Provençal *patois*, "there isn't much to see this way except the forest: but down there," pointing behind him in the opposite direction, towards the great cabbage-garden which covers the alluvial plain of Hyères, "down there one sees a magnificent country". The one view was like a bit of miniature Switzerland; the other, like a huge market-garden, as flat as this page.

Even in our own time and place, amongst our own race, one may see a similar aesthetic level with farmers and labourers. "So you're going to Devonshire," said a Lincolnshire yeoman to his minister (from whom I have the story): "you'll find it a poor sort of country after this. You'll never see a field of corn like ours down there, I take it." "Your country, sir," says a distinguished American visitor in England, "is very beautiful. In many parts, you may go for miles together, and never see a tree except in a hedge. Nothing more beautiful can be conceived." (I take the words down from the report of an "interviewer".) To the farmer, hills like those of Devonshire were mere obstructions to ploughing: in the eyes of the practical American, trees were simply objects to be stumped and annihilated in the interest of good farming.

So long as communications are difficult and roads bad, this agricultural aspect of natural beauty will remain uppermost. It is difficult to appreciate scenery in the midst of practical discomforts. The Alps were naturally mere barriers of snow to Hannibal and Caesar. The Scotch highlands were less beautiful to lowlanders when they were inhabited by hostile clansmen with a taste for cattle-lifting. Even in the last century, one is struck by the many serious discomforts which Johnson suffered in going to the Hebrides or travelling through Wales. Telford's Holyhead road must have done much to quicken the aesthetic sensibilities of the eighteenth century in England. I have myself noted in Jamaica how much the appreciation of really beautiful scenery is spoilt by the discom-

forts of the climate and the difficulties of transport. In such circumstances, an aesthetic feeling for scenery can hardly develop itself. Still less could it do so during the perpetual state of siege in the middle ages, or the constant warfare of the little Hellenic republics, when no man could travel a few miles from home save on urgent business and with due precautions. A lovely pass or a frowning gorge can hardly become beautiful in the eyes of those who see in it everywhere a lurking brigand.

On the other hand, when travelling becomes easier, a taste for scenery naturally arises. All the mental elements of the taste are already present; only their combination is wanted to complete the aesthetic growth. Tastes educated and refined by the arts of the city must find beauty ready to hand in much of the country. The garden and park, the Italian terrace and the Versailles avenues, the ornamental grounds and artificial lakes of the last century, formal as they seem to us now, show the gradual growth of the taste. A view from the castle or the hall becomes a desideratum. To look out upon fresh green fields and trees rather than upon the walls and narrow streets of a city must always have been pleasant to all but the most restrictedly anthropinistic minds—though even in our own day there are many townsmen who would find more to interest them in a crowd of people than in the loveliest scenery on earth. Again, only highly cultivated minds can thoroughly enjoy the beauty of places which have been always familiar from childhood: and we can hardly expect a taste for scenery to develop amongst people who necessarily live (like all but the most civilised) in one narrow place for all their days. Under such circumstances, the perception of its beauty can never arise. The habit of making tours, at first confined to the very wealthy, but gradually spreading down to the middle classes and the mass, has undoubtedly had an immense effect in strengthening the love of nature. Those who only know the stereotyped features of their own suburban fields, often flat and unlovely, cannot acquire any deep interest in scenery. But when Wales and Scotland, Auvergne and Brittany, Switzerland and the Tyrol are thrown open for us all, the habit of comparing, observing, and admiring grows upon us unawares. Those railways which Mr. Ruskin so cordially despises have probably done a thousand times more for promoting a love of beauty in nature than the most eloquent word-painting that was ever penned even by his own cunning and graceful hand.

If one may trust an individual experience, it is not the first waterfall that charms the most. Niagara itself, when seen in early youth, does not produce nearly so strong an impression as the little Swallow-Fall at Bettws-y-coed in later years. The

more one sees, the more one learns what to expect, what to observe, what to admire. Here it is the wind-shaken foam-streak of the Staubbach ; there, the little dancing cascades of the Giesbach ; and here again, the vast unbroken emerald-green sheet of the Horse-Shoe Fall, pouring in ceaseless majesty into the seething turmoil of waters at its mist-begirt feet. Each has its own beauties of grace, prettiness, or sublimity, and each is largely apprehended and appreciated by means of half-unconscious recollections of the others. Between the American and Canadian falls at Niagara, a little belt of water forces its way through the gap which severs Goat and Luna Islands, and forms a minor cataract of its own, hardly heeded in the presence of the two great rivers plunging headlong at its side. If one fixes one's attention for a few moments on this little sheet of foam, one recognises after a while that it is really larger than any cascade in western Europe. And if you then turn your eyes to the vast semicircle of deep green water on your right, you feel at once that without that standard of measurement your eye and brain would have failed adequately to grasp the mighty dimensions of Niagara.

Thus, step by step, in our own individual minds, and in the history of our race, the aesthetic faculty has slowly widened with every widening of our interests and affections. Attaching itself at first merely to the human face and figure, it has gone on to embrace the works of man's primitive art, and then the higher products of his decorative and imitative skill. Next, seizing on the likeness between human handicraft and the works of nature, envisaged as the productions of an anthropomorphic creator, it has proceeded to the admiration for the lace-work tracery of a fern or a club-moss, the sculptured surface of an ammonite, the embossed and studded covering of a sea-urchin, the delicate fluting of a tiny shell. Lastly, it has spread itself over a wider field, with the vast expansion of human interests in the last two centuries, and has learnt to love all the rocks and hills and seas and clouds of earth and heaven for their own intrinsic loveliness. So it has progressed in unbroken order from the simple admiration of human beauty, for the sake of a deeply-seated organic instinct, to the admiration of abstract beauty for its own sake alone.

GRANT ALLEN.

II.—THE UNITY OF THE ORGANIC INDIVIDUAL.¹

IV.

ALL essential properties of the living substance remain unexplained. Their origin and interdependence are as enigmatical as ever. It is indeed well known that nutrition, growth and reproduction, heredity and adaptation, motility and sensibility, are organic powers actually at work in nature ; for their sundry manifestations visibly intermingle, and give rise to all the manifold vital performances exhibited by living beings. It is also well known that the complex organism is differentiated into specific tissues ; for the respective positions and properties of these tissues are everywhere studied with the utmost precision. But concerning the intimate molecular operations that originate the fundamental vital activities, science is, as yet, completely in the dark, and it is in the dark also concerning the conditions that determine the position and the differentiation of tissues.

We have found, on close examination, that all these fundamental vital occurrences have resisted elucidation, even when attempted by the foremost investigators. Thus the science of Life is still left adrift without any first principles to guide its intricate course. Shall we then, for the present, abandon the task as premature ? Or shall we pronounce it altogether impracticable ?

Where masters have failed, surely I, their obscure disciple, would never venture to come forward with a view of my own. But it so happened that by some fortunate accident nature allowed herself, as I believe, to be caught in my presence without her usual impenetrable guise. I could not help seeing what others have so long sought for in vain. By some strange fascination I was drawn into giving careful attention to the peculiar amœboid movements displayed by homogeneous protoplasm. Day after day, and month after month, for five years (1872-7), I kept close watch on those slow and monotonous movements. From near and far a vast array of specimens were gathered, showing every imaginable variation of this one central activity—the pushing forward and the retracting of projections. Here, as it seemed to me, vitality was caught in tentative operation, transparent and unmasksed by any morphological complications. If perseverance could ever solve the mystery, it must now yield.

¹ Concluded from MIND XIX., pp. 318-36.

I followed the sluggish current of hyaline material, issuing from globules of most primitive living substance. Persistently it forced its way into space, conquering, at first, the manifold resistances opposed to it by its watery medium. Gradually, however, its energies became exhausted, till, at last, completely overwhelmed, it stopped, an immovable projection, stagnated to death-like rigidity. Thus, for hours perhaps, it remained stationary, one of many such rays of some of the many kinds of protoplasmic stars. By degrees then, or sometimes quite suddenly, help would come to it from foreign but congruous sources. It could be seen to combine with outside complementary material drifted to it at random. Slowly it would thereby regain its vital mobility, shrinking at first. But gradually, completely restored, and reincorporated into the onward tide of life, it was ready to take part again in the progressive flow of a new ray.

On the other hand, I watched also the brisk current of more highly elaborated but still homogeneous protoplasm, proceeding in unbroken continuity and direct line through space, never fully overcome by normal surroundings, but always replacing its foremost substance, as quickly as it became shattered against the powers of the medium, the whole molecularly mobile being constituting a continuous flow of ever-renewed life, forward-pressing, and triumphing over the disequilibrating forces, by dint of prompt and adequate reintegration.

So I continued watching and pondering, till it all seemed clear to me, till these primitive displays of vital activity had disclosed—to the satisfaction of my own mind—the constitution and interdependence of the elementary properties of life, and therewith also the conditions of primitive organisation.

It was Haeckel who discovered monera, and who was the first to point out their fundamental importance to biology. He says himself:—"Monera obviously prove that our conception of the organism has to be derived dynamically, or physiologically, from its vital movements, not statically, or morphologically, from its organological composition." "Life is not a consequence of organisation, but, on the contrary, it is the formless protoplasm that builds up organised forms." Nothing could be more lucidly conceived than the ideas expressed in these memorable sentences. They were evidently inspired under the immediate influence and observation of the undifferentiated living substance. By clear implication, they proclaim the molecular unity of the organic individual. If the unbroken cycle of molecular motions inherent in formless protoplasm is the source of life and organisation, then surely the higher this life, and the higher this organisation, the more complete and perfect must be that

unbroken cycle of molecular motions that sustain them. Break up into many separate and autonomous morphological elements the unity and continuity of life, so unmistakably embodied in the molecular process constituting protoplasm, and where, in reality, is there left the bond which holds together the dissevered portions of the vital and organic nexus? There remains, indeed, nothing but hyperphysical ties and supernaturally established harmonies, where, at the beginning, we had it all consistently encompassed within a single material and self-sufficient unity.

Haeckel's cosmological and biological preconceptions hindered his thorough appreciation of the truths so strikingly demonstrated in the vital manifestations of monera. The fundamental error that prevented the keen and philosophical discoverer of these morphologically undifferentiated beings from gaining an understanding of the true nature of their substance is the same old error that is everywhere else obstructing the understanding of life. It is that notion of bare Aggregation which to-day forms the working hypothesis and ultimate postulate of all our sciences; it is the metaphysical assumption that two and two make four without a combining medium. Atoms aggregate to molecules. Molecules in the inorganic world aggregate to crystals; in the organic world to living morphological units; the climax of all this grouping being reached at last in the aggregation of the morphological units to complex organisms. So the universe, *in toto*, is believed to be constructed out of nothing but atoms variously grouped.

In a former section of this article we have seen how Haeckel, in faithful adherence to the mechanical hypothesis, felt obliged to invoke the aid of metaphysical powers in order to impart reproductive energy to his organic mechanism. We now find his profound conception of life and organisation, as resulting from a dynamical process and not from a juxtaposition of units or parts, vitiated by just the same fundamental error—the endeavour to produce qualitative combinations by mere multiplication and arrangement of equal elements. In keeping with this view, the protoplasm of monera is held to represent an aggregate of equal molecules. It follows that in each such molecule there must then reside undivided all the elementary properties of life, and, in this case, the subsequent development of vital manifestations can only be due to the combination of the energies of multitudes of such elementary units diversely grouped. Equality, however, puts a stop to every progressive movement, and takes the life out of any co-operative system. In organic nature, equality of constituent units or molecules means simply the dissolution of the chemical nexus of protoplasm, and with it the cessation of the intense vortex of life. It means death-equilibration, final victory of the

inorganic powers over the great microcosmic molecule, all-resisting and all-comprising, but now rapidly falling to pieces, its bondless material soon finding a quiet and uneventful level in ever so many equalised units of CO_2 , H_2O , and NH_3 .

It is thus that Haeckel has scientifically suppressed the vital activities at their point of origin, effectively stopping the dynamical process from which he hoped to see organisation result. Organisation, however, does in all reality result from the dynamical play that sustains the living substance, and it is our principal task to show exactly how this occurs.

Here it will be well to remember the marvellous complexity of those confessedly unicellular beings, the ciliated infusoria. *Paramecium aurelia*, previously described (MND XIX. 328), with its all but complete organisation, cannot possibly represent a mere aggregate of equal plastidules. Here, at any rate, it is positively demonstrated that the protoplasm of a single cell—leaving the nucleus, at present, out of consideration—that the protoplasm of *Paramecium aurelia* must consist of a definitely interdependent series of highly differentiated molecules. Surely, it must be a most specific bond of union which thus harmoniously maintains the structural diversity and permanent shape of this morphological unit; a most specific chemical cycle, which thus coerces its continuous protoplasm into the complete variety and concourse of organic divisions.

If the problem of organisation is not solved here in its unicellular form, where it is presented to us in all its main features without further morphological perplexities, how can we ever hope to gain an insight into it after each of these fundamental features has, in the course of development, undergone a series of most puzzling complications?

Why then is this morphological unit constructed such as it is? Why is it thus shaped? Why has it an oral and an aboral pole, an integument, a contractile layer, a digesting substance, &c., &c.? These are questions which sound strange indeed, almost as if emanating from the school of Schelling and Oken; yet it will presently be seen how completely justified they are from a strictly scientific point of view.

Here is a clear-cut protoplasmic ovoid flowing evenly along, straight across the field of the microscope. We will not let it slide by without closely scrutinising its activities; for, after carefully examining them, it will seem as if this morphologically undifferentiated organism had been made on purpose to reveal to us the secret of tissue-formation. It embodies all the essential traits of organisation, but organisation not yet structurally fixed. Like our *Paramecium* it also maintains a definite shape. It is bilaterally symmetrical. It has an oral and

an aboral pole, an incipient integument and contractile layer, a digesting substance, a depurative vesicle peculiarly situated. It takes food in only in front, retains it till digested in the centre of its body, and eventually evacuates the residue at the aboral pole. There can be no doubt it constitutes a complete organism with definitely determined positions for all its parts. Yet it can be readily ascertained that it consists, nevertheless, of nothing but a fluent mass of molecularly coherent protoplasm. We have here before us a single unit of living substance, fluent through and through, and exhibiting notwithstanding a strictly localised distribution of organic divisions and functions; we have before us a living vortex, maintaining itself, and advancing head foremost through space.

Much of the mystery of vitality and organisation will have disappeared when this issuing-forth of vital motion, and this fluent shaping of organic divisions, will have become intelligible to us. All the differently functioning regions of our vital vortex gain their peculiarities merely from the special position which they occupy in the chemical cycle that constitutes protoplasm. We have here, indeed, essentially one and the same substance performing all the sundry organic offices; but it is by no means one and the same substance in one and the same state of efficiency. It is a complex chemical circuit that gives rise to the definite location of all the chief differentiations of the organism; and it is the same substance at the different stages of this its chemical circuit, which, by means of its specifically changing relations, becomes in turn the seat of all the main performances of vitality. We can with our bodily eyes follow this shaping and organising circuit:—From the neighbourhood of the digesting protoplasm within the body of our fluent ovoid there emerges a continuous flow of finely granulated material, and farther on in front there issues from the granular matrix a perfectly hyaline substance. This foremost, expanded, hyaline substance suffers disintegration at its surface of contact with the medium, and is then thrust aside by the bursting forth of new expanding material. The disintegrated protoplasm slides down along the outer surface of the moner, forming there a gradually contracting envelope, which, at last, closes in at the rear, completely collapsed, and ready to re-enter the renovating, ascending current. Food coming in contact with the foremost portion of the moner gets wrapped up in a coat of the protoplasm, which it thus touches, and is lodged with the same as a nutritive corpuscle in the centre of the body. Between the disintegrated protoplasm gathered in at the rear and the stationary deposit of food, generally one single depurative globule ministers both to functional and to nutritive depuration.

We know now for certain, for we have accurately witnessed it with our own eyes, that the fundamental features of organisation assumed by the living substance are the result of the same chemical cycle by which this very substance is itself formed and maintained. However important in itself this truth may be, its acquisition throws light only on one part of our problem. There remains to be shown what the exact conditions are that give rise to and that sustain the chemical cycle, which has been disclosing itself so plainly as the true source of vitality and organisation.

Vitality is from the very start a complex activity, a variously related process. It can never be derived from forces inherent in a chemically occluded molecule, in a molecule from which no constituent atoms become dissociated, and with which no outside atoms become integrated. The disintegration and re-integration of the protoplasmic molecule is the fundamental exertion and essential procedure of life, its very being. You may fit out an ever so complex organic molecule with ever so many physical and psychical endowments; yet such a molecule, chemically occluded, can take part in evolution only by an intrinsic rearrangement of its own atoms, never by the procreation of more molecules of its own kind, or of any kind whatever. Its vital energies are hopelessly locked up within its own material allotment. But we need not speculate any further on this radical topic. Direct observation will furnish us with positive knowledge on just the point we are so desirous irrefutably to establish. We clearly perceive that the hyaline substance of a protoplasmic projection becomes disintegrated by its exposure to the normal influences of the medium. We know for certain that the change which it has visibly undergone represents not merely an isomeric modification, but a genuine chemical change. We are sure of this, because we distinctly see the products of disintegration gathering into a separate globule, and being then, in a liquid state, discharged into the medium. After a while the disintegrated protoplasm of the projection is observed to combine with selected foreign substances, and thereby to regain its former properties. Consequently, we can conclude that it has become reintegrated by union with complementary material. The actual occurrence of such a chemical process satisfactorily proves that, whatever molecules have taken part in the change, one or many, they have certainly suffered dissociation of some of their own atoms, and have then reintegrated themselves by appropriation of other atoms derived from outside sources.

In this one elementary action of molecular disintegration and re-integration, consists the germ of all life, and of all organic

evolution. The development of organic forms is due to the elaboration of the different phases of this one central event. A complex organic molecule suffers disintegration through the dynamical impulses of the medium. By dint of its own intrinsic affinities it then reintegrates itself with complementary material.

The first phase of this elementary act of life represents the impressibility of the protoplasm, its faculty of getting chemically disturbed through the influence of certain dynamical forces, but disturbed only within definite and recoverable bounds. It is this side of the molecular process which develops into the life of cosmic relations, the so-called animal life.

The second phase represents the chemical affinity of the protoplasm to certain specific materials, and develops into the life of chemical relations to restitutive substances, the so-called vegetal life.

The ectoderm is the structural realisation or, in other words, the morphological organisation of the relations of the living substance to the sundry dynamical or disintegrating powers of the medium. The entoderm is the structural establishment of the relations of the living substance to its chemical or reintegrating resources.

We may legitimately allow ourselves to imagine that, at the dawn of life, the primitive protoplasm stood in direct chemical continuity with adjoining material, which material fitted exactly into the chemical gap produced by the disintegrating influences.¹ This simple and direct relation obtaining during the early stages of protoplasmic elaboration became, however, more and more complicated in proportion as organic evolution progressed. On the one hand, the development of the life of dynamical relations, or—what amounts to the same thing—the development of its structural embodiment, the ectoderm, called for more and more elaborate restitutive material. On the other hand, the growing incongruity of the raw material furnished by the medium for restitutive purposes, necessitated a series of preparative processes. These organic prerequisites are met by one portion of the common protoplasm being partitioned off exclusively for food-digestion and food-assimilation.

¹ I have not discovered any moner demonstrating this most primitive stage of restitution. But I have found several kinds whose processes could never be seen to combine with any solid food-particles, though I watched these beings sometimes for 18 consecutive hours. The stagnant projections, after long exposure to the mere fluid medium, would very gradually regain their mobility. A distinct residual flake, however, slowly gathering within the body of the moner and eventually ejected, proved that the restitutive material had not been exactly complementary.

At first, any portion of the protoplasm that happens to come into contact with food, forms with the same, by dint of their mutual chemical affinities, a circumscribed globule, in which the elaboration of the restitutive material is effected. In monera, in amœbæ and in many ciliated infusoria these nutritive corpuscles may occupy any interior portion of their protoplasm. But in other ciliated infusoria, in our *Paramaecium*, for instance, the nutritive corpuscles are formed at the extreme end of the gullet by a peculiar whirling process,¹ in which minute food-particles are intimately mixed with protoplasm. The nutritive corpuscle thus constituted descends then into the hindmost portion of the granular substance, occupying the space between the ectoderm and the walls of the gullet. There it finds itself in close proximity to a depurative vesicle. A turbulent chemical process ensues in the nutritive corpuscle between its food-particles and its protoplasm. The depurative vesicle discharges in rhythmic contractions the products of decomposition yielded by this first stage of the digestive process. It requires from six to twelve depurative pulses to render the nutritive corpuscle fit for its long journey through the granular protoplasm, which it pursues along the definite currents of this fluent substance, till digestion is fully completed and its useless residue evacuated through the aboral aperture.

In other infusoria we find a localised digestive cavity with the beginning of a distinct and permanent entodermic structure. One large nutritive corpuscle occupies the centre of the body of these worm-like infusoria. The peripheral portion of this nutritive corpuscle forms part of the permanent entodermic structure, which fact can be readily ascertained, when—as occurs from time to time—the central portion of the nutritive corpuscle is evacuated through the mouth to make room for new food.

All entodermic structures represent further developments of this digestive operation, by which the elaboration of restitutive material is effected. The preparation of adequate restitutive material is the formative cause, as well as the functional office of the entoderm. The direct chemical relation, which primitively existed between the protoplasm and its food or restitutive material, is indirectly maintained in higher organisms by the interposition of a definite series of preparatory stages structurally represented by the entoderm. The entoderm furnishes to the higher organism the adequate restitutive material which the lowest organic forms derived directly from the medium.

¹ By feeding with indigo or carmine this shaping of nutritive corpuscles can be made very striking.

In vegetables we find an immediate chemical relation, even to inorganic materials, still preserved. Inorganic compounds make up the raw-material, which the vegetable elaborates into substances adequate for its own restitution and propagation. These substances, thus prepared by the vegetable, furnish the raw-material further elaborated by the animal into substances adequate for its much more complex restitution. The essential relation obtaining between the vegetable and the animal is one of preparatory synthesis, commenced by the vegetable, and continued by the animal. The relation is not, as usually supposed, one of mutual compensation, of alternate deoxydising and reoxydising of compounds. The vegetable is not the hoarder, and the animal the spendthrift of our planet. The animal takes up the work of molecular elaboration slightly begun by the vegetable, takes up that slender thread of organic stuff spun by the yellow rays of the vivifying light, and weaves it into the magic fabric of world-revealing, world-conquering brain and muscle.

So much, at present, concerning the origin of the entoderm. Now it devolves upon us to find out how the chemical nexus, constituting vitality, gives rise to the principal structures of the ectoderm.

In stellate monera, in which the rays become so deeply deteriorated as to remain exteriorised and deadened till redeemed to life by direct combination with complementary material, in such inferior monera it is clear that preparation of restitutive material becomes a function of every ray, *i.e.*, of every portion of the moving substance. The substance of each ray melts under the influence of food, and composes with the same a nutritive corpuscle, which then yields the products that assist in the formation of new rays.

In the course of organic development the process of external and direct rehabilitation is gradually transformed into a process of internal and indirect rehabilitation. This progressive and momentous change, which I call the *intussusception* of nutrition, is clearly demonstrated in a series of different monera. The material prepared by one retracted ray through direct combination with food goes to restitute from inside the disintegrated material of another ray. Thus, one portion of the living substance comes to prepare the products for the immediate restitution of another portion, which latter portion is now, in consequence, enabled to assume exclusively the dynamical relations with the medium. In this manner a digesting part of the common protoplasm becomes subservient to a moving part, which fact means that the entoderm has simply to furnish the restitutive material for the ectoderm. By this ascendancy the

ectoderm has gained the power of carrying on unrestrictedly its dynamical play with the medium.

It will sound fantastic in the extreme, when I state that this simple truth concerning the supremacy of the ectoderm forms the groundwork of all moral and social abilities. I cannot at present pause to defend the position, but will only say that the study of nature cannot well reveal a more significant relation than the one here demonstrated as actually obtaining between entoderm and ectoderm. We know now for certain that a living being does not normally move, feel and think for the ultimate purpose of feeding; but it feeds, that by moving, feeling and thinking it may reach higher stages of development. Life means at its very rise the increase, refinement and unification of its correspondence with the dynamical powers of the universe.

In attentively watching all kinds of monera it becomes unmistakably evident that the main business of moneric life is to be found in the shattering of its ever-renewed projections against the disintegrating influences of the medium, or rather in the assiduous, never-flagging renovation of its shattered substance. The unceasing reiteration of this one action leaves no doubt that in its performance is embodied the chief purport of life. What then is the true meaning of this fundamental vital activity, and how does it accomplish ectodermic organisation?

Here, for once, I assume unproved (the nature of the case not admitting any ready proof), I assume that the disintegrating influences of the medium exert a gradually modifying, a specifically elaborating effect on the protoplasm. By splitting off from its substance a definite molecule, the dynamical forces will determine to some slight extent the result of its reintegration. The pre-established direction of its intrinsically organised affinities suffers some infinitesimal change through the molecular disturbance generated on each concussion. Instead of restoring with absolute precision its former integrity, the protoplasm incorporates a molecule slightly differing from the one it lost. Its complexity is thus increased by the well-known process of chemical substitution. Surely this is the laborious operation through which progressive changes force their entry into the living substance. By this process of superimposed increments of molecular elaboration, the functional disintegration of the active protoplasm gains the significance of functional evolution, the functioning material assuming truly the part of an evolutionary substance.

We know that in plants organic compounds are built up by an analogous process. For elements split off by dynamical influences, there are substituted, by force of intrinsic affinities, other elements, which go to make up higher compounds than

those previously decomposed. Disintegration affords the stimulus upon which there ensues higher integration, by means of affinitive substitution.

In the laboratory organic compounds are likewise built up on this plan of gradual substitution.

The constructive power at work in this most essential process of molecular elaboration is clearly a power of indwelling chemical affinity, a power by which new elements are incorporated with a pre-existing molecule, so as to form with the same one single chemical unit.

Affinitive integration, the marvellously efficient and specific force by which the living substance is empowered to effect its own chemical saturation, to complete thereby its own structural integrity, and even to complicate the same by further developmental accretions, this acknowledged force openly and obviously displayed in every vital action constitutes, indeed, the true source of all living energy, the quickening spring that gives birth to all the enigmatical phenomena emerging from the mystic life-stream of fleeting existences.

Other current doctrines notwithstanding, this slowly elaborated power of complemental restitution to full integrity of a previously established most specific chemical unit is the true power that winds up the spring of life, that furnishes to the organism the vital resistance with which it is enabled effectively to encounter the disintegrating forces of the medium. The usual supposition that vital energy is derived from the re-oxydation of deoxydised food-ingredients, is on a par with that other supposition that makes the chick emerge from its shell a mere equivalent of the heat-waves that ministered to its incubation. Such notions only too obviously reveal how utterly our present science misapprehends the stupendous energies that are sustaining life.

To choose the most familiar instance in connexion with this question, the origin, namely, of muscular power, it is generally believed that on stimulation non-nitrogenous constituents of the muscular substance, or non-nitrogenous fuel directly derived from the blood, undergo oxydation, and that muscular contraction represents the mechanical equivalent of some of the heat evolved during the process. This conception, typical of the present state of vital dynamics, is erroneous in every respect. The fact is, that on stimulation a hyaline substance much higher in the chemical scale than myosine explodes. A non-nitrogenous molecule is thereby split off, seized by oxygen, and rapidly transformed into eliminable products. This process of oxydation and elimination is merely an accessory depurative performance, and does not essentially and directly enter into the actuation of

muscular contraction. The remaining muscular substance, a nitrogenous compound, somewhat of the constitution of myosine, contracts, because it forms part of the physical nature of this portion of the disintegrated muscular protoplasm to assume as near as feasible the globular shape. Thus far, some few physiologists, among whom Hermann is most conspicuous, have by laborious researches gained a true understanding of muscular activity. But now comes the point where utter darkness still prevails. The contraction of muscular substance represents thus a collapse from a high state of tension, a falling back into an inferior state of equilibrium. What power is it that winds up again the spring of action, that restores the potential energy expended in contraction, that replaces the muscle into its position of dynamical advantage? My protoplasmic studies give me the plainest possible answer to this fundamental question of vital dynamics. It is the mighty power of chemical renovation, by dint of which the protoplasm recovers from its state of contracted inability, and forces with renewed energy its way onward again into space. It is the functional restitution of the moving substance and its concomitant expansion that constitute the long-sought-for source of muscular power. Expansion furnishes the energy. Contraction expends it. Expansibility is the fundamental physical property of protoplasm, not contractility as universally believed. The pushing out of hyaline expanding material in course of chemical cumulation is visibly the life-spring of protoplasmic motility.

It is only fair to confess that chemical activity, with its definite selective preferences and its constructive origination of specific properties, is an ubiquitous energy at present completely beyond the reach of our scientific comprehension. Neither physical nor psychical interpretations have hitherto availed to throw any light on its mysterious nature. The various attempts at a mechanical explanation, *i.e.*, at a reduction of chemical laws to the simple laws of mass-motion, have not even succeeded in offering a plausible suggestion as a hypothetical basis to start from. And with regard to our modern hylozoism, inspired by Schopenhauer and becoming prevalent even among the scientific celebrities of our time, it can only be said that it plainly proves that we have once more exhausted the combinations all round. We are growing conscious that our earnest and most determined efforts to make motion produce sensation and volition have proved a failure, and now we want to rest a little in the opposite, much less laborious conjecture, and allow any kind of motion to start into existence, or at least to receive its specific direction from psychical resources; sensation and volition being for the purpose quietly insinuated into

the constitution of the ultimate moving particles. If, however, evolution is to be our scientific creed, we can expect the great and good things only after strength has been gradually gathered through endless toil.

Chemical elaboration then discloses itself as the secret activity of which the vital energies are concomitant manifestations. Of whatever ultimate incident chemical composition may be the perceptible symbol, to us it is the embodiment of a synthesis accompanied by the appearance of new properties, scientifically incalculable and unaccountable.

The properties of the molecule of water are even less intelligible to us than the properties of the living molecule. Of the former we possess only a mediate knowledge; of the latter, also some little immediate knowledge.

From point to point we are formulating the great truth that the centralised animal organism represents only one single monadic molecule.

When intussusception of nutrition is fairly established, when all food is at once drawn into the organism by the immediate shrinking of the digestive substance and the pushing forward of new evolutional substance, and when all restitution is internally effected by means of complementary material accurately prepared through chemical processes within the organism, then the more and more rapid restitution of the functionally disintegrated protoplasm becomes the very obvious sign of further evolutional progress. The fact cannot be misapprehended. The more quickly protoplasm, when overpowered by the dynamical influences, is capable of chemically recovering, the higher must that protoplasm be considered to stand in the scale of evolution. This growing power of rehabilitation can, of course, only be due to an advancing molecular elaboration of the living substance—an elaboration evincing itself functionally in a more effective resistance to the disintegrating influences.

The results of this chemical development can be observed at very many different stages in different monera. The more inferior the moneric protoplasm, the more deeply is the disintegrating effect seen to penetrate its outermost expanded region. The slower is then also the restitution, and the more extensive the shrinking which accompanies it. More time and more space are occupied by the chemical or functional oscillation of the living substance. This complex molecular process, with its concomitant manifestations, which composes the definite period from the moment of disintegration to the moment of complete reintegration, I call the *functional unit* of the living substance. The higher the living substance the smaller its functional unit, *i.e.*, the less profound its disintegration the less the time

requisite for its restitution, and the less the extent of its shrinking.

It is clear that the functional unit is nothing but the elementary vital activity of disintegration and reintegration now definitely regulated by means of the intussusception of nutrition. It represents the unimpeded immediate play between the organism and its dynamical medium, specific restoration of chemical equilibrium following in definite succession, in strict periodicity, specific disturbance of chemical equilibrium.

Now, let us suppose that, at the entire surface of such an ovoid moner as we have previously described, the power of resisting disintegration on the part of the living substance has grown so effective as to admit of no perceptible shrinking at any point; that just so quickly as the protoplasm is disintegrated, just so quickly will it also recover at the very spot—that in fact the chemical oscillations at the entire surface of the organism have at last become equivalent to the disintegrating dynamical pulses: when this stage of organic elaboration has been reached, then it is very evident there will occur no more shifting of protoplasmic masses at the parts thus equilibrated, or, which is the same thing, the surface will have gained the position and consistence of a permanent organic structure.

In the same way it can be watched almost stage for stage how, by the growing power of prompt restitution, deciduous projections are transformed into the permanent prehensile whip of protoplasmic units.

Where surface-equilibration has been established, the primary functional unit of the protoplasm, its surface-unit of disintegration and reintegration, which bears the first brunt in carrying on the immediate functional play with the medium, will constitute itself from the living substance just underneath it. The definite explosive shock of the primary functional unit, spreading to the adjacent material, will cause specific disintegration of the same. The next moment the affinitive restitutive force comes into play, and the complemental molecule required by the primary functional unit for its renovation will be readily abstracted from the deeper-seated disequilibrated material, which thereby will constitute a secondary functional unit. Thus the functional disturbance started at the surface will be propagated in definite pulses through a certain depth of protoplasm—a depth increasing with the progress of organisation, and involving at last the entire protoplasm down to the digesting substance. In this manner the intrinsic chemical flow of protoplasm becomes in the course of development definitely circumscribed, and functionally subdivided into a number of consecutive functional units. It is thus that the ectoderm, as a

permanent structure originates, living structures being maintained from moment to moment by chemical restitution.

In watching our ovoid moner we perceive that the nutritive corpuscles are embedded in a large mass of granular material, and that it is not this material which constitutes the really active portion of the protoplasm. The substance which more particularly exhibits the mass-effects of the molecular operations of the organism is seen to emerge from the granular matrix as a perfectly hyaline material. Products derived from the nutritive corpuscles go first to compose the granular matrix, and products derived from the granular matrix go then to compose the hyaline active substance. In some monera the evolution of the perfectly hyaline material from a matrix, growing by degrees finer and finer grained, can be directly witnessed, and there can remain no doubt that the protoplasm of a moneric projection is a continuously evolved substance increasing in chemical complexity the further it gets advanced from the region where food products are directly assimilated. The foremost and outermost portions of the projection, its apex and its circumference, are the chemically highest portions of the entire protoplasmic unit. The living substance is therefore not merely a vortex, but, moreover, a chemically cumulative vortex, and it is the internally culminating and externally most exposed region of the protoplasm which comes into immediate collision with the surrounding medium, experiencing therefrom functional derangement. I have on several occasions made use of the expression "centralised organism," confining more especially to this class of organisms the views here propounded. Our ovoid moner is a centralised moner in the sense here implied. Its hyaline substance does not protrude in manifold narrow projections, retracting again after exposure to the medium, and being followed by new projections at different places. On the contrary, it flows on interruptedly through space in one and the same direction. The entire organism may be looked upon as forming one single projection, through the apex of which a renewed flow of hyaline material is ever maintained. The chemical cycle forming the protoplasm of this centralised being is so balanced within itself, and in relation to the forces of the medium, as to constitute a single fluent activity, by which it moves, is shaped, and receives its sundry organic differentiations.

We see here demonstrated in a most obvious manner how the highest evolutional substance is always found foremost in space, and we feel that, with the understanding of this grand fact, we have penetrated one of the supreme secrets of vitality—that of head-domination. We know now that this headmost portion of the living substance represents primordially and con-

stitutionally the consummation of all the organic labour performed within the living individual, and that it is therefore intrinsically fit to enter into higher relations with the dynamical medium than any other portion.

Concerning the difficult problem of animal individuality, it may prove serviceable to remark that the inwardly restitutive protoplasmic projection, with its chemically cumulating substance, highest at the apex, next high at the circumference, and with its direct dependence on the digesting substance, constitutes in all reality the primitive zooid, the veritable animal unit. All essential divisions and directions of organisation are predetermined and foreshadowed in its molecular composition and activity. The entoderm and ectoderm, the longitudinal axis, with its cephalic and acephalic pole, the transverse axes, that remain equal when the animal does not creep but that get distinguished in size and import through the establishment of a dorso-central differentiation when the animal does creep,—all these fundamental tendencies of organisation are contained in the specific flow of the living substance, and are invariably expressed in the shape of a protoplasmic projection.

We observe that even a single mass of fluent protoplasm may constitutionally form a star with many rays—may virtually represent a multi-zooid being; whilst other masses of fluent protoplasm form but one single projection, and may on that account be called centralised units.

Further complications in animal individuality arise through generative multiplication. We see, for instance, the very complex organism of our *Paramecium* divide, so as to give rise to two beings of exactly the same complex kind. The substance of two zooids thus formed, and not yet separated, may in other animal classes coalesce chemically, and also to a more or less extent morphologically. When completely unified in this manner, they constitute merely segments of a single individual, now in future directly reproducible through propagation. But beings formed by generative multiplication may remain morphologically connected to some slight extent without coalescing chemically, in which case the morphological aggregate will not be directly reproducible through propagation.

Generative multiplication may, however, also take place through budding from various parts of a parent organism. Here again the consecutive generations thus produced may coalesce so as to form part of a single unit, in which case the different zooids will lose their separate individuality, and become more and more modified so as to minister to the uses of the centralised organism. Or, on the other hand, many consecutive generations may remain morphologically connected, without any centralisa-

tion being effected. All these different modes of connexion between living units sometimes mingle in the organic world, and prepare a rather puzzling task for the morphologist. Add to this the phenomena of phylogenetic condensation, progressive metamorphosis, alternate generations, retrogressive metamorphosis, embryonic evolution, and we cannot wonder that so little progress has hitherto been made in the understanding of organisation and vitality.

The perplexities of this difficult subject will, however, to a great extent disappear, when biologists will have become convinced that the protoplasmic projection represents the primitive zooid, uncomplicated by morphological intricacies. Whether appearing as tentacle, or as appendage of any kind, as paramer or metamer, the protoplasmic projection or primitive zooid undergoes morphological subdivision only by specification of its molecularly coherent substance. Never is its structure successively put together by the aggregation of a multiplicity of autonomous living elements. Its integument becomes divided and subdivided into areas of specific stimulation, and correspondingly its contractile layer becomes divided into muscles and subdivided into muscular fibres. But never do separate units go to range themselves so as to fill up in due order an ideal space between two points that are thereby to become the cephalic and the acephalic pole, some of the units building up the integument, others the contractile layer, all working diversely towards one common purpose with which they are not incorporated, governed therein by laws extraneous to themselves.

The vagaries of this latter conception would be patent to everyone, if embryology did not seem to enforce exactly this view. But it must be remembered that embryology is merely reproductive evolution, and cannot possibly furnish an adequate standard for the understanding of productive evolution. Even embryology, however, in its demonstration of consecutive and continuous germinal layers gives confirmation to this new mode of viewing fundamental differentiation.

Besides we have almost direct proof of it. Some of the lowest worms are not much more advanced in the scale of organisation than certain ciliated infusoria. They are of about the same size, and without special preparation their integument and their contractile layer appear hardly less homogeneous than the corresponding structures of the infusoria. Now, on disruption of the integument by crushing, or on application of certain chemicals, the substance of the integument in these worms will become converted into a dense crowd of globules, which in some kinds are nucleated, in others not. The contrac-

tile layer, however, is not in the same way resolvable into units. Is it at all justifiable to look upon infusoria as morphological units, but to take the worms, on the contrary, for creatures whose equivalent structures have been put together by the aggregation of an astonishing number of autonomous elements? No reasonable defence can be found for such a position.

The ectoderm of the zooid is first differentiated into layers, and afterwards these layers are partitioned into subdivisions.

When in a being like our centralised ovoid moner surface-equilibration has been reached, when the functional unit has become synchronous with the dynamical unit, when the chemical surface-vibrations keep accurate time with the dynamical medium-vibrations, when the power of local resistance on the part of the living substance has become equivalent to the power of local disintegration on the part of the external agents, —then we have a structurally established organism. We have seen that in an organic unit of this kind the protoplasm constitutes a chemically cumulating substance, of which the outermost surface, *i.e.*, the most advanced part in space, forms the molecularly culminating layer. It is clear then that the functional units of this chemically highest surface-layer will be smaller than the functional units of deeper-seated layers. The former, therefore, will exhibit greater resistance to disintegration, more rapid recovery and less shrinking than the latter.

The dynamical influences affect only the primary functional unit, the surface-unit. Direct stimulation can extend no deeper. It is therefore the primary functional unit that controls all deeper-seated function. All functional activity can spread only from the surface of contact with the medium, and the rest of the protoplasm is thus entirely dependent for its functional stimulation on the activity displayed by the layer of protoplasm constituting the primary functional unit.

The functional units grow larger, display slower action and more shrinking, the more remotely their substratum is located from the surface, and the less advanced, in consequence, the stage of chemical elaboration which it represents.

Thus a functionally resisting substance at the surface becomes, by degrees, differentiated, and gains full control over the functionally yielding substance of the interior of the ectoderm.

The outermost layers of the highest product of molecular organisation, having become fully attuned and vibrating in accord with the dynamical influences of the medium, exert now complete and direct sway over the contracting layers of inferior protoplasm, with which functional continuity has been established. And, by their specific restitutive demand, they exert

also complete, but more indirect, sway over all other organic activities.

What then is the vitally essential property of this dynamically equilibrated, chemically highest, outermost region of the protoplasmic unit, which exerts functional control over the entire individual?

The answer is quite plain, indeed altogether unmistakable. The resisting substance is, and can be, in essence, only incipient nerve-tissue.

A spectator, witnessing through the medium of his senses the performance of the moving protoplasm sees it expand and contract. Were the same spectator endowed with sufficient power of vision he would, on watching the resisting substance, undoubtedly see it also expand and contract, only with exceedingly small and rapid beats. That is, in fact, all that an outsider can possibly behold of life: motions of protoplasm in definite directions, and more or less rapid.

But it is no less certain that some of these vital motions, perceptible, or, at least, representable by an outsider, correspond inwardly to an entirely different fact, experienced only by the moving protoplasm itself. The same occurrence which outwardly and mediately is perceived as motion by others, constitutes, under certain conditions, inwardly and immediately in the living substance a peculiar experience, called sensation.

It is reasonable to suspect that the condition under which evolutional function begins to correspond to something inwardly felt is not fulfilled until the organic beats have become fully attuned to the dynamic beats. But as the resisting substance is gradually developed from the shrinking substance, it can be readily conceived that sensibility itself must gradually arise from the unknown and unknowable state which inwardly corresponds to what we perceive as motor activity. In this light it can remain no longer surprising that we actually find motility and sensibility so intimately interblended in nature.

We have now reached a position, from which we can comprehend the conditions that have led to the formation of the various fundamental germinal layers, increasing in organic value in proportion as they approach the surface, and increasing still more in organic value in proportion as they approach the headmost region of the protoplasm.

The resisting protoplasm of the surface of the organism constitutes intrinsically a chemically graduated substance, of which each succeeding zone is different in quality from the one preceding it in position. Through more and more specialised attunement to the impulses impinging upon it, the continuous material of the layer at last divides, and then again subdivides

into a number of separate areas of specific stimulation. Thus a surface-mosaic of most definite sensorial elements is formed. The separateness of these external points of stimulation in the resisting substance involves ultimately a corresponding separateness of dependent stimulated partitions in the shrinking or contracting substance.

In the course of further organic development the stimulated effects realised in the separately corresponding elements of the attuned surface-mosaic will reach the hyaline evolutional substance. There, by a process of complex harmonisation, analogous to the one which took place at the surface, the composite value of the variously blended surface-stimulations will receive its structural realisation.

In ciliated infusoria the occurrence of this centralisation of surface-impressions can be inferred with much probability. For days I have watched the sharply circumscribed, coarsely granular nucleus of gigantic amoëbæ, and have become almost convinced that it constitutes an organ of water- and oxygen-supply. For days also I have watched the constantly changing outline of the all but hyaline so-called nucleus of infusoria (*Vorticellæ*, *Colpodæ*, &c., &c.), and have become almost convinced that we have here before us the centrally-confined evolutional substance, the incipient nerve-centres.

However much the outside influences succeed in cleaving with their specialising stimulations into myriads of divers integral parts the *morphological* unity of the organism, the *chemical* unity in its affinitive range triumphs over every estrangement. Infringed upon in its expanse from all sides, the homogeneous substance becomes all the more completely elaborated, all the more subtly sensitive to every change. Perceiving the different influences of the medium in their most specialised form through the intervention of the fully harmonised functional units of securely isolated nervous substance, it is ready to reproduce with the vast totality of its own inhering power the generically accumulated and chemically organised significance of the sundry transient promptings of individual life.

The view of vital occurrences here lightly sketched has rendered clear many phenomena of life hitherto unintelligible. It has yet to stand its most trying test. We have seen how utterly other theories have failed consistently to account for the activities of growth and reproduction. The increase in bulk by the interposition of spontaneously constructed physiological units or plastidules, and the multiplication by division of overgrown masses thus constructed, are suppositions so palpably at variance with plain facts that only the blind logic of the

aggregational propensity could have led to them. Whoever has watched the division of highly differentiated infusoria with its exact duplication of every slightest detail of the complex organisation, ought to be aware that something very different from mere overgrowth is here conspicuously in operation. The upper half of the dividing animalcule has to reconstruct a lower half, and the lower half has to reconstruct an upper half. Evidently, the same influence is here normally at work that repairs an organism when by accident it has lost one of its halves; and growth itself can mean essentially nothing but repair or reconstruction of the generical type from some fraction of an individual.

I believe that the conception of life here maintained, the conception, namely, that the individual organism constitutes but one single chemical unit, will be found to afford an easy and scientifically legitimate explanation also of these most recondite phenomena of vitality.

Any portions of the unitary protoplasm of an organic individual, and especially its so-called germs, have to be considered in the strictest sense of the term, chemical *radicals*. You remove from a chemical compound a part of its integrant atoms; it is then no longer saturated, but represents a chemically disequilibrated residue with combining powers corresponding to the severed atoms. Whenever occasion offers the radical will become re-saturated; it will in fact restitute itself, will restore the integrity of the compound which it radically represents.

Surely it is this admitted chemical occurrence which underlies the vital phenomena of growth, repair and reproduction. In this light the fundamental activities of life can be conceived as one single consistent chemical action, functionally checked by outside influences. This play of intrinsic and extrinsic forces may be conveniently expressed in the following table:—

Functional restitution or resistance.	Functional disintegration or impressibility.
Correlative reconstitution or repair.	Correlative disorganisation or waste.
Generical equilibration of growth.	Generical disequilibration or seeding.

These are the very intelligible categories of vital activity. To contradistinguish the theory of organisation here briefly expounded from the prevailing Cell-theory I call it the Theory of Specification,—specification of one single protoplasmic unit into definite areas of disparate stimulation, not association of a number of elementary organisms for the purpose of dividing among themselves an hypostatized physiological labour.

V.

The triumph of the Cell-theory is mainly due to the conjunction of three very different circumstances. (1) The morphological appearances of embryology seem visibly to demonstrate that the entire organism is made up of nothing but successive generations of units derived by propagation from one single parent. (2) The independent vitality really and apparently displayed by morphological units when detached from their organic connexions gives a powerful support to the notion of their autonomous vitality. (3) The plausible application to such vital units of the laws evinced in the socio-political co-operation of individuals or persons ends by rendering the position of the cell-theory all but impregnable. Let us shortly consider the three points in order.

(1) Ontogenesis is only reproductive genesis. A minimal speck of material safely and quietly deposited in favourable environments reproduces in a few hours, days, or weeks what originally had taken ages upon ages of wide-spread struggle to accomplish. The ways of this intrinsic reproduction cannot by any possibility faithfully retrace the ways of the original development. The latter was most gradually impressed from outside into the molecular constitution of the living substance. The former is already adequately pre-established in the molecular constitution of the germ-cell. The germ-cell represents essentially the condensed result of accomplished development, not an initial stage in a development yet to be achieved. The unfolding of the germ is the reconstitution of organic effects already chemically secured, not the incidental securing of organic differentiations during evolutional progress. The multiplication or division of the germ-cell signifies therefore an entirely different process from the multiplication or division of unicellular organisms. In spite of the amoeboid motions performed by germ-cells, there can exist in the whole range of organic nature no greater contrast than between a germ-cell that reproduces an entire complex organism and a genuine amoeba that only reproduces its own kind. The application of the common term "cell" to both these organic units can only mean that the one is a protoplasmic body enclosing a second protoplasmic body, and the other is also a protoplasmic body enclosing a second protoplasmic body. The amoeba represents a complete protoplasmic unit, generically fully equilibrated. The germ-cell represents a generically disequilibrated fragment of a protoplasmic unit.

It is asked, May not the higher organism owe its existence to the coalescence of a whole series of alternate generations? Any attempt to conceive the complex organism as an assemblage of alternate generations—each tissue with its structural elements representing the asexual multiplication of one of these alternate generations—must fail for the simple reason that the sexual reproduction of the series can then only take place from the generation highest in the scale of development. The germ-cell of vertebrates, for instance, would have to be derived from the most developed portion of their brain. How could it otherwise contain, for future reproduction, the developmental increment of brain-activity? We find, on the contrary, that material remotest from the brain, somewhere near the margin of direct intercommunication between ectoderm and endoderm furnishes the substance, the chemical radical, requisite for reproduction.

Embryology renders undoubtedly very essential services to biology, but it is by no means competent to assume the controlling influence in the formation of a theory of organisation.

Whoever has kept an incubating machine going is well aware how exceedingly perplexing the crowded appearances of embryological evolution prove to be. Even the most patient and skilful observer gets lost in the labyrinth of tangled forms. Considering the pretensions of embryology, it may seem rather surprising to outsiders that the embryological origin of even the principal structures of the ectoderm remains as yet altogether problematical. It is not definitively settled, it is not even approximately made out, which of all the possibilities is the one actually occurring in nature. Whether nervous and muscular elements represent each one single cell, or whether they represent each a number of coalesced cells, or whether they are somehow exuded or otherwise deposited during the chemical transformation of cellular protoplasm, or lastly whether they owe their existence to cells immigrating from other parts—these are all suppositions plausibly maintained and alternately recurring from time to time. It requires, indeed, much doctrinal faith to make oneself believe that the continuous stretch of protoplasm constituting the ectoderm represents any cells at all, that the exquisitely slender and elongated nerve-fibre and the comparatively enormous muscular element participate in the same cellular nature with the epithelium-cell or the blood-corpuscles.

(2) As regards the autonomous vitality of organic elements, the white blood-corpuscles have had chief stress laid on them. The white blood-corpuscles, of which all red blood-corpuscles are transformations, perform amoeboid movements. What more striking proof of the separate vitality of each single cell could be found, than the display of motility on the part of its protoplasm? Nevertheless these movements are not vital movements, but merely the effect of a chemical metamorphosis of protoplasm. Young infusoria under unfavourable conditions are sometimes unable to maintain their surface-equilibration. They are then transformed into amoeboid beings, the substance of which gradually declines in molecular constitution till, at last, all activity ceases. A white blood-corpuscle forms originally an integrant part of an organic tissue. It is then detached from this and left to attain chemical equilibration in a new and constantly changing medium. In some annelids the inner surface of the entoderm, the surface forming one of the walls of the perivisceral cavity, is seen during digestion to become densely crowded with large refractive granules. Irregular flakes composed of such granules held together by a viscid hyaline protoplasm detach themselves and float about in the perivisceral cavity, constituting primitive blood-corpuscles and displaying amoeboid movements. This I have watched numbers of times.

The essential office of the blood-corpuscle is to elaborate restitutive material by means of its chemical interaction with the medium in which it floats. This interaction, however, cannot be considered vital, for the blood-corpuscle does not maintain its structural integrity. On the contrary, it is transformed from a lymph-corpuscle into a red blood-corpuscle, and, after having spent its store of chemical efficacy, is soon eliminated as effete matter. Its amoeboid movements are not due to any vital play with the medium, but are simply movements accompanying its career of chemical transformation. In pus-corpuscles even the myeline-nature of the projections can be sometimes detected with the help of the polariscope. The most perfect movements of the kind that I ever witnessed were displayed by pus artificially derived from the epithelium of an eye macerated in serum for 48 hours at a temperature of 96° F.

This, I think, will be found to be the correct interpretation of one more

of the circumstances that have conspired to give the cell-theory its present predominance.

(3) How shall we now lastly dispose of the socio-political argument?¹ It is maintained, not only in a figurative sense, but quite seriously as a matter of fact, that the organism is a co-operative society of elementary individuals, and *vice versa*, that human society is an organism. Much brilliant thought has been spent in the glorification of the supposed relations. But however tempting a little polemical skirmishing in this direction might be, I prefer, after all the weighty considerations that have been brought forward in proof of the molecular solidarity of the protoplasmic organism, to abstain from these more fanciful modes of argumentation.

Mental science is destined, I believe, to become the most powerful as well as the most positive of all sciences, for the simple reason that it is the only immediate and direct science, the only science in which the objective and the subjective aspects coincide, in which they corroborate each other, signifying for once one and the same fact. The peculiar motions of objects that form the subject-matter of other sciences are only signs for qualities roused by stimulation in the observer. There the motions observed in the object do not to our knowledge coincide with any subjective state concomitantly experienced by the object. Consequently these motions signify to us merely that we the spectators are affected in certain definite ways by an unknown process occurring outside of us. It is quite otherwise with mental states. Here the peculiar motions witnessed or inferred by the observer in the neural substratum are directly indicative of corresponding qualities inhering in the moving object. This complete equivalence of motion and sensation obtains nowhere in nature but in sentient foci, and may lead in the course of time to the construction of an exact science of qualitative values, whilst in our present sciences qualities are only very inadequately represented by quantitative symbols.

¹ Everyone has heard something about the celebrated discussion between Haeckel and Virchow concerning the teaching in schools of cellular physics, metaphysics, ethics, and politics. To an impartial judge, it must seem evident that Virchow took his punishment with the true spirit of a scientific and political martyr, faithful to the liberal professions of his youth. The veteran politician and veritable originator of the socio-political interpretation of cell-life knew right well that, if ever the Iron Chancellor became alive to the fact that his beau-ideal of a state was actually realised in nature as the most consummate of all her achievements, the vertebrate constituting an "admirable cell-monarchy" with "hereditary castes" and lower orders that execute promptly and without grumbling the dictates of their superiors, forthwith the inculcation of the tenets of the cell-theory would become the chief business of all the schools in the land till every person would cheerfully accept his allotted place in the social scale, and the humblest of them rejoice in time of peace or war to fill the office even of a blood-corpuscle.

At all events it is now very generally admitted that an accurate knowledge of the corporeal substratum of mind is indispensable to the precise interpretation of mental phenomena. And it is quite certain that we cannot understand the life of the nervous system without correctly establishing its relations to the rest of the organism, and its relations also to the universe at large. An adequate theory of organisation is an essential pre-requisite to psychology. A psychology that can be made to harmonise with the Aggregation-theory must differ *toto genere* from a psychology in harmony with the Specification-theory.

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III.—ANOTHER VIEW OF MR. SPENCER'S ETHICS.

MR. HERBERT SPENCER informs us in the preface to his *Data of Ethics* that the concluding part of his philosophical system, to which this volume serves as an introduction, is that for the sake of which all the rest was undertaken. And in fact the principles here enunciated are substantially identical with those set forth thirty years ago in the author's *Social Statics*, and repeatedly enforced in various essays published during that interval. Stated generally those principles may be described as an attempt to combine the standpoint of Bentham and his followers with the standpoint of Wilhelm von Humboldt, and both with the theory of an innate moral sense. We have now before us a further attempt to base the resulting system on the doctrine of Evolution considered as a whole. So comprehensive and conciliatory a scheme coming from so high an authority deserves to be examined with the closest attention. Mr. Spencer exercises a wider influence than any contemporary philosopher, his present theme is one of universal interest, and he views it in the light of a life's experience and meditation. Yet it may be questioned whether his ethical theory will command even as much acceptance now as when it was first propounded. It will not be surprising if those works which their author regards as merely subsidiary should really constitute his chief title to rank among the leaders of European thought, and if the end which he values so much more highly should be dismissed to the limbo of philosophical utopias. It would of course be unfair to judge of the new ethics until it has been laid before us in its entirety. I shall therefore refrain from discussing the author's very striking and original method of deducing rules of conduct immediately applicable to present circumstances from the idea of a perfect

social organism conceived as the necessary term of evolution; merely observing that to begin at the end seems a reversal of the mode of study usually followed by believers in development, and that the analogy of mathematical reasoning might equally be invoked in favour of any ethical code whatever. Fortunately the present volume is so planned that a large portion of it, touching on the fundamental problems of morality, may be discussed without reference to any ulterior instalments. I propose to offer some remarks on this portion, and in so doing it will be convenient to follow an order of exposition slightly different from that adopted by Mr. Spencer.

Every ethical system to be complete must directly or by implication give an answer to the four following questions; what is the highest end of action, or otherwise expressed, what is the absolute standard of right and wrong? then, how do we prove our answer, how convince others that our standard is the best? thirdly, from what motive do men act rightly? and lastly, by what means can the right end be attained? Sometimes the same answer might be given to two or even three of these fundamental questions, though never, I think, to all of them. For example, our own gratification might conceivably be named as the end, the verification and the motive of right conduct; or conscience might both reveal the law of duty and prompt us to obey it; or the very act of obedience might convince us that we were right. Logically however they are distinguishable, and great confusion often results from not keeping them apart. To the first demand Mr. Spencer's answer is clear and emphatic. Pleasure is the absolute end and all other things are valuable only as means to it. Even life would not be worth having without pleasure. Whose pleasure, whether mine or yours or theirs, must be determined subsequently. We proceed to ask, how do you know this, how do you prove your principle? The question had already presented itself to J. S. Mill who also adopted the hedonistic standard. According to him the proof of utilitarianism is that nothing is desirable but happiness, meaning by happiness pleasure and the absence of pain. But tastes differ; what seems desirable to one man may be undesirable to another; and if there is an absolute standard it must be the same for all. To prove that pleasure is alone desirable we had better show that as a matter of fact nothing else is or ever has been desired; that those who assert their preference for other ends are labouring under an illusion; that every object of pursuit not originally pleasure-giving has become so by association with pleasurable feelings. This is precisely the method chosen by Mr. Spencer. He appeals in support of his assertion to the recent controversy on the value of life. All mankind are divisible into pessimists and

optimists, and both parties, however radically opposed, "agree in one fundamental postulate. Both their arguments assume it to be self-evident that life is good or bad according as it does, or does not, bring a surplus of agreeable feeling. The pessimist says he condemns life because it results in more pain than pleasure. The optimist defends life in the belief that it brings more pleasure than pain" (p. 27). The inference being that by general agreement, implied if not expressed, life derives its whole value from the pleasurable feeling accompanying it. Here with all deference I must observe that Mr. Spencer is doubly if not trebly mistaken. In the first place, although Schopenhauer and his school are hedonists, it is perfectly possible to be a pessimist without thinking that pleasure is the end of life and that we do not get enough of it. Some persons if they were convinced that certain knowledge was unattainable, even if they expected it to yield them no pleasure, might regard that as a reason for preferring non-existence to existence. In the second place, as it is generally better if possible to meet your adversary on his own ground, an optimist who believes that life affords a surplus of pleasurable feeling may very well advance that argument without conceding that such a surplus alone makes life worth having. And, thirdly, as a matter of fact the optimists do not make this concession. M. Caro, an eminent representative of the spiritualistic school in France, has distinctly declared that granting the excess of pain over pleasure to be possible and even probable, he still remains an optimist, that even an unhappy life is worth living, and that suffering is preferable to nonentity.¹

A fortiori would such persons maintain that a perfectly neutral state of consciousness, a life totally devoid both of pleasure and pain, is worth having. Thus the appeal to authority completely breaks down, a single recusant being enough to invalidate it. Nor does it help the argument much to ask, as Mr. Spencer does, whether this and that virtue would still be looked on as virtues did their practice produce pain instead of pleasure, or contrariwise whether certain vices would still retain the name if their effects were reversed. For the question is not whether pleasure is a good and pain an evil, but whether pleasure is the only good and pain the only evil. An attempt to reduce various other standards to the hedonistic standard is vitiated throughout by the assumption, so far unproved, that life and pleasure are interchangeable terms; while, with a great want of philosophic calmness, opinions at variance with the author's are attributed to a survival of devil-worship and other savage superstitions. What-

¹ "La vie même malheureuse vaut la peine d'être vécue et la souffrance vaut mieux que le néant."—*Revue des Deux Mondes*, Dec. 1, 1877, p. 507.

ever may be the genesis of moral beliefs, to cast imputations on an opponent's ancestry is more characteristic of barbarous than of civilised controversy. In discussions like the present appeals to universal agreement are of little avail, as the disputant whom they are supposed to confute must by hypothesis furnish in his own person an exception to the general rule. Apparently no attempt has been made to study the strongest and most recent writers on the contrary side. Every argument adduced by Mr. Spencer must be perfectly familiar to Professor T. H. Green and yet have failed to convince that eminent dialectician. To declare pleasure a necessary form of moral intuition¹ must in the present state of the controversy be pronounced a piece of unwarrantable dogmatism.

There is however a more powerful method of demonstration in reserve. If the conditions of life in its fullest, most enduring manifestations are such as to make pleasure a necessary cause, accompaniment, and consequence of volition and sentiency; if those individuals and communities who make pleasure their supreme end are the fittest to survive; in a word, if evolution is on the side of the hedonists; and if it can be shown that every contradictory hypothesis is inextricably bound up with beliefs peculiar to an imperfect form of civilisation; then utilitarianism will be freed from the necessity of answering objectors by their gradual elimination in the struggle for existence. But before considering whether this or a somewhat different result follows from an unbiased application of the new scientific method, let us first glance at the attitude assumed by our author towards the utilitarian school. While recognising the superiority of that school over its predecessors, he is careful to distinguish his own doctrine which is rational from that of the old utilitarians which is empirical. He agrees with them in judging actions by their results; but according to him they fail to show why some classes of actions necessarily produce happiness and others misery, and his aim is to supply the deficiency. He compares their empirical generalisations to the observations by which ancient astronomers were enabled to predict the position of the heavenly bodies with an approach to accuracy before Newton came and by discovering the law of gravitation showed that those bodies must occupy certain places at certain times. The analogy is not very fortunate, for, granting hedonism to be true, ethical science has already found its Newton in David Hume. The great Scotch philosopher set up a principle which comprehended and explained all partial moral laws just as universal gravitation explained Kepler's laws

¹ P. 46. Observe the confused use of terms. On Mr. Spencer's own showing pleasure is a kind of feeling, and feeling is matter, not form.

and the Copernican system. He showed that certain courses of action were prescribed because they were socially useful; and taking the recognised virtues in order he showed how they corresponded to such utilities. Others have followed since then and have explained perturbations in the rules by variations in the standard. There is still plenty of room for scientific discovery in tracing the process by which each utility came to be recognised as more than merely individual, and perhaps also in devising an improved machinery for its attainment; but so long as hedonism keeps the field Hume's general method seems unlikely to be superseded. Further explanations appear to indicate that Mr. Spencer would have every class of actions judged by its tendency to raise or lower the aggregate life of the community. He supposes the case of a man who is either wounded or starved or badly paid or robbed or calumniated or otherwise ill-treated, and shows without difficulty that his power of maintaining life is thereby directly or indirectly diminished.¹ But no instance of a necessary connexion between antecedent and consequent is here exhibited which Bentham or any other old-fashioned utilitarian would not have been equally able to detect. The only difference seems to be that Bentham would have taken into account not only the loss of health and life but also the pain inflicted as an element in the various classes of wrong-doing; whereas the new scientific morality makes conduciveness to life the supreme standard of rightness, and this after telling us that life is only valuable on account of the pleasure it yields. Perhaps however the object is to show why some actions cause pleasure and others pain. If so it must be observed that such investigations, interesting as they may be, belong not to ethics but to physiology or psychology. For every purpose of the moralist it is enough to know what kinds of action cause pleasure and pain without stopping to ask why they possess that property, any more than an architect need trouble himself about the cause of gravity and cohesion. I have already attempted to indicate in what direction a true scientific basis for utilitarian ethics may be sought, and the materials furnished by Mr. Spencer will enable us to ascertain how far such a support is really supplied.

To understand the behaviour known as good or bad we must begin by viewing it as part of a larger whole, that is of conduct in general. Conduct comprehends all adjustment of acts to ends from the simplest to the most complex. Again human conduct is part of animal conduct which must be studied by tracing its antecedents, in other words by considering it as a product of

¹ Pp. 58-60.

evolution. On comparing lower with higher animals and savage with civilised men, we find that the latter are respectively distinguished from the former by a more complete adjustment of means to ends securing a richer or a longer life or both together for individuals, and a more careful nurture for their offspring. The most perfect adjustment of all is attained when members of associated groups and the groups themselves as wholes instead of encroaching on each other, co-operate for the achievement of a common end. This is only possible in peaceful societies and only in them can evolution attain its limit. "Ethics has for its subject-matter that form which universal conduct assumes during the last stages of evolution." Good conduct is that by which men attain to the completest life. The view here unfolded is confirmed by an examination of the various senses in which the words 'good' and 'bad' are commonly used. Things and actions are classed under either head according as they do or do not attain the purpose which we expect them to subserve. A man's conduct is called good when it tends to self-preservation. Parents are accounted good who carefully attend to their children's health while preparing them for the requirements of adult life. Still more emphatically is the term applied to those who help their fellow-men to live; while in all three cases bad is used to designate conduct tending in the contrary direction (pp. 1-26). In connexion with these facts I may observe that moralists of every school are far more agreed on the necessity of maintaining life than on the absolute desirability of pleasure. Even the philosophical pessimists never make away either with themselves or with their neighbours, and inculcate a morality not unlike that of their optimist opponents. Life is in fact the means to all other ends and must be secured before they can be pursued, as must also be the means to life itself. Were this truth steadily borne in mind much less alarm would be felt about the theoretical stability of morals. Another reflection suggested by the foregoing analysis is that while moral conduct has this in common with animal activity that it is adjusted to ends and that it contributes to life-maintenance, it is distinguished from all other activity by profoundly characteristic differences corresponding to those that divide a person from a thing. It is indeed only by a somewhat equivocal use of terms that purely animal activities can be spoken of as having an end at all. Where we find a series of functions moving round in a perpetual circle it is a false abstraction to pick out one of them and call it an end, or to speak of the whole circle as an end and of each link as a means. Ends only exist in and for the reason by which they are constituted. Moral conduct must be conscious, its consequences must be foreseen, and they must interest others besides

the agent. When a man takes care of his health his conduct is not moral unless we admit that his life is held in trust for beings outside himself. All the higher animals care for their young; human beings alone bring up children to reproduce and reflect their own personal existence. And the limit of morality seems to be reached, not when the greatest possible sum of animal life has been obtained, but when a permanent reciprocity of personal relations has been established. Abstinence from aggression and rendering of mutual assistance are doubtless conducive to longer life, but their principal value lies in the spirit they reveal. Moral conduct cannot be explained by the mechanical theory of evolution until the consciousness of personality has been first explained as a rearrangement of matter and motion, or as an aggregation of feeling determined by an integration of nervous processes. In fact, moral conduct is a part of reason, differing from vital actions not only in degree but in kind. It preserves life, but only because life is an indispensable means to the attainment of every other end. Thus we are again brought round to the question, what is the value of life? And we have to consider what light is thrown on it by evolution. Mr. Spencer holds that advancing life tends to increase the proportion of pleasurable sentiency. His argument is as follows:—

"If we substitute for the word Pleasure the equivalent phrase—a feeling which we seek to bring into consciousness and retain there; and if we substitute for the word pain the equivalent phrase—a feeling which we seek to get out of consciousness and to keep out; we see at once that, if the states of consciousness which a creature endeavours to maintain are the correlatives of injurious actions, and if the states of consciousness which it endeavours to expel are the correlatives of beneficial actions, it must quickly disappear through persistence in the injurious and avoidance of the beneficial. . . . At the very outset, life is maintained by persistence in acts which conduce to it, and desistance from acts which impede it; and whenever sentiency makes its appearance as an accompaniment, its forms must be such that in the one case the produced feeling is of a kind that will be sought—pleasure, and in the other case is of a kind that will be shunned—pain" (p. 79).

There is a certain ambiguity about the words 'accompaniment' and 'correlative' here applied to sentiency. The nervous process causing any beneficial act, as for instance swallowing, may on the subjective side be a pleasurable sensation, and so understood the two would clearly be correlatives. On the other hand, it might conceivably be accompanied by a neutral state of consciousness or by none at all. Pleasurable sensations would then be located in a particular part of the nervous system which would be so connected with the centres presiding over deglutition as to be brought into play simultaneously with them and to excite other actions tending to their support. The same

reasoning will apply to the connexion between injurious actions and pains, only that here the reaction would be inhibitory. I write under correction, but it seems to me that the second alternative is the more probable. Acts usually accompanied by pleasurable or painful feeling are owing to various causes occasionally performed unconsciously, which looks as if the nervous process causing them was itself indifferent, although in ordinary circumstances it awakens the activity of another centre inseparably associated with intense sentiency. But if so much be granted, it seems clear that the nervous connexions leading to beneficial actions might become so firmly established as to need no assistance from the pleasure-producing processes which might then fall into disuse and perish from inanition. Pleasure or at any rate the molecular movement underlying pleasurable feeling involves a very appreciable expenditure of force, as may be seen from the exhaustion consequent on intense enjoyment and quite out of proportion to the muscular effort expended in procuring it. Accordingly those whose lives can be maintained without its assistance will have a great advantage over others who remain dependent on it for the performance of life-subserving actions. This hypothesis will explain why evolution after going on for so many ages has left us with such a moderate sum of enjoyments, and why that sum should be greater with children than with grown-up people. It also throws some light on the mischievous effect of indulgence in stimulants and narcotics. The pleasure they give is too dearly purchased by consumption of energy. Mr. Spencer has adduced numerous instances to prove that pleasure as such is good for the health, and so it may very well be, especially when taken in moderate doses, by heightening the energy of the nervous processes without being a necessary accompaniment of healthful function.

It may be observed that hedonism and evolution are so far if not at cross purposes at least playing different games. Hedonism only values life for the pleasure it yields; evolution only values pleasure for the life it subserves. As we have seen, there is reason to believe that if life could be preserved at less expense the boon would be withdrawn; and there is no reason to believe that such an important saving in the vital economy will not be made hereafter. If owing to improved physiological and social arrangements pain should simultaneously disappear, sentiency will be fixed at the zero point. Half the hedonists' prayer would be heard, but the other half would be dispersed in empty air. Human beings would not, like George Eliot's unhappy inventors, be displaced by self-propagating steam-engines, but they would themselves have become as passionless as any machine. We appealed to evolution and this is the answer that we get. What

more natural than that a machine or something like one should be the ultimate outcome of mechanical laws?

We have now to consider what answer Mr. Spencer gives to the third fundamental question of ethics, that which relates to the motives of moral conduct, the impulses to right action. His whole chapter on the Psychological View may be regarded as an attempt to deal with this problem from the evolutionary standpoint. Assuming that conduct is right according as it tends to secure the most pleasurable existence for self and others, and observing that conduct departs more or less widely from this standard whether we compare together different men at the same time, or the same man with himself at different times, or societies in different stages of civilisation, we have to discover the causes of their variation.

Conduct, according to Mr. Spencer, is never free but is exclusively determined by motives. Motives consist of mental presentations or representations combined with pleasurable or painful feelings. They are most simple with the lowest animals and become more complex as evolution proceeds. The primary impulse of self-preservation cannot always be followed with safety. Experience shows that the actions it prompts are under certain conditions attended by painful consequences. Thus when the actions are mentally pictured as a preliminary to their performance they call up a representation of the attendant pains which acts as a deterrent. The association becomes embodied in nervous structures and is transmitted to the animal's offspring, a process secured by the survival of the fittest, as those individuals in whom it has not been effected will perish through their want of foresight without leaving progeny behind. As mind goes on becoming more complex a hierarchy of motives is established, the simpler being generally less authoritative than the more compound and ideal, that is, those into which the representation of remoter consequences enters as an element. Generally but not always; for disregard of the primary impulse may be self-defeating, as when a mother absorbed in maternal duties neglects her health so much as to become incapacitated for their discharge. Here the author seems for once to have understated his case. When two motives conflict action must ultimately be determined by another motive more abstract than either of them, a fact well expressed by the saying 'It is not true that second thoughts are best but third'. Self-regarding virtue is easily explained by the foregoing analysis. A prudent man abstains from immediate gratification or submits to immediate pain, that he may secure a greater pleasure, or escape from a greater pain hereafter; he learns by experience to estimate the relative values of pleasures and pains, as well as to recognise the conditions on which they

depend; his self-control and sagacity give him a great advantage in the battle of life, and the results of his empirical generalisations may be transmitted as intuitive judgments to his descendants. Conduct affecting others is to a certain extent controlled by the same class of motives. Impulses prompting aggressive acts are held in check by four distinct restraints of a prudential character; fear of retaliation from the injured person or his friends; fear of legal punishment; fear of divine vengeance; fear of public opinion; while conversely beneficial actions are prompted by the hope of gratitude and reward. The last three sanctions go on evolving with the evolution of society which in their turn they powerfully aid.

With regard to the religious sanction a few words must be said in passing. Mr. Spencer holds that theological belief originated not, as all rationalists used to suppose, with the personification of physical forces, but with the ghost-theory, that is the belief that every man has a double continuing to exist after his death, capable of injuring the living and of being propitiated by sacrifices. The commands of a powerful chief originally issued for the purpose of maintaining discipline by forbidding aggressions that lead to quarrels would continue to be obeyed after his death through dread of his ghost. Political injunctions are enforced by fear of the living, religious injunctions by fear of the dead. It seems a pity to disturb such an ingenious and symmetrical theory, but I am not aware that it is supported by any external evidence, while there are strong reasons for dissenting from it. Modern inquiries into the history of jural conceptions show that among primitive men kings were not legislators but judges, and not so much judges as arbitrators freely chosen by the contending parties to mediate between them, but without power to enforce a reference of the case to their own decision. From a number of isolated judgments was formed a general law, and at a still later period of civilisation all the laws then current were consolidated into a code the authorship of which was sometimes attributed to a god. If the god were derived from a ghost, his origin and the enactments of the person whose ghost he was must by that time have passed into complete oblivion. The original judgments or Themistees as the Greeks called them were looked on as being supernaturally inspired,¹ no doubt a strong way of expressing the popular belief in their infallible rectitude; and this circumstance coupled with the fact of their being given at the request of the parties concerned seems to prove that from the beginning right was not based on authority, but conversely authority on a

¹ See Maine's *Ancient Law*, pp. 4 and 5, 7th ed.

sense of right; for it was precisely to decide which was right that both parties called in an arbitrator. Mr. Spencer is very severe on those who talk as if it was being prohibited that made an action wrong. But probably no one really thinks this. People look on the prohibition not as a cause but as a proof of wrongness. Moreover they have a well-grounded though confused feeling that actions must be classified before their morality can be determined. As a utilitarian would say, they must be judged by their general consequences. The legislator having done this once for all has saved others the trouble of doing it. Thus the popular trust in authority supplies a salutary correction to the equally popular intuitionism or rather sentimentalism which would pronounce on each particular case according to the dictates of personal sympathies and antipathies often of a very frivolous character. Another objection to Mr. Spencer's account of the religious sanction is that the gods of a progressive people, originally conceived as indifferent to the moral conduct of human beings, are afterwards brought into relation with it. Homer's deities take sides from purely personal motives without regard to the merits or demerits of Greek or Trojan. But on passing over some centuries we find Zeus and Apollo, as represented by the Delphic oracle and the *Aeschylean* drama, possessed of very lofty moral attributes, inflicting heavy penalties on the murderer, the robber, the seducer; punishing an evil intention as much as an overt act. Evidently they had been moralised just like human governors by a constant appeal to their arbitration and protection.

Passing from the origin of religious restraints to their essential character, it is surely unfair to speak as if this consisted solely or chiefly in the expectation of rewards and punishments. So far as the conduct of a truly religious man is influenced by his faith, it is not through the fear, but through the love of God. Nor do I mean simply that he obeys the moral law for God's sake, as he might perform some otherwise disagreeable task at the desire of a beloved friend; but I mean that, through the intermediation of God, through the consciousness of a divine nature permeating all humanity, other men are brought so near and, as men, are made so dear that for him wilfully to injure them would be like a denial of his own existence. He feels that this divine presence is essentially one with the unity of his own personal consciousness, and with the unity in distinction between himself and the objective world. This fundamental synthesis, whether we choose to give it a theological interpretation or not, everywhere constitutes the limit of inquiry and the condition of intelligence in metaphysics, in psychology, but most clearly in ethics; and the impossibility

of expelling it from thought is proved by the inevitable incoherencies and self-contradictions of those who would dispense with or deny it. Whether and how far this observation applies to Mr. Spencer will perhaps appear on continuing the exposition of his principles a little further.

The three orders of restraints—political, religious and social—above specified are not properly called moral: their deterring effect is due to an extrinsic artificial consequence of the immoral act, not to its intrinsic natural consequence, which is a mental representation of the injury inflicted. Nevertheless, we are informed that the highest or purely moral restraints are evolved from the others, as well as that they come into existence at a later period. We have now to ascertain how the evolution is accomplished. This transition from enlightened self-interest to dutifulness, involving, if necessary, a sacrifice of self, is the most important point in the whole system, and, in order to avoid the possibility of misconception, it will be advisable to quote Mr. Spencer's own words.

"The restraints properly distinguished as moral are unlike these restraints out of which they evolve, and with which they are long confounded, in this—they refer not to the extrinsic effects of actions but to their intrinsic effects. The truly moral deterrent from murder is not constituted by a representation of hanging as a consequence, or by a representation of tortures in hell as a consequence, or by a representation of the horror and hatred excited in fellow-men; but by a representation of the necessary natural results—the infliction of death agony on the victim, the destruction of all his possibilities of happiness, the entailed sufferings to his belongings. Neither the thought of imprisonment, nor of divine anger, nor of social disgrace, is that which constitutes the moral check on theft; but the thought of injury to the person robbed, joined with a vague consciousness of the general evils caused by disregard of proprietary rights.

Conversely, the man who is moved by a moral feeling to help another in difficulty, does not picture to himself any reward here or hereafter; but pictures only the better condition he is trying to bring about. . . . Throughout, then, the moral motive differs from the motives it is associated with in this, that, instead of being constituted by representation of incidental, collateral, non-necessary consequences of acts, it is constituted by representations of consequences which the acts naturally produce. These representations are not all distinct, though some of such are usually present; but they form an assemblage of indistinct representations accumulated by experience of the results of like acts in the life of the individual, superposed on a still more indistinct but voluminous consciousness due to the inherited effects of such experiences in progenitors: forming a feeling that is at once massive and vague." (Pp. 120-1.)

Experience teaches us the consequences of our actions (let me observe, in passing, that the powerful effect of education is quite ignored), and the representations, or, in common parlance, the knowledge of them prompts us to refrain from the bad, and to perform the good. But how can an experience of intrinsic

consequences be evolved out of an experience of incidental consequences? According to the laws of association, it is just the contrary effect that ought to be produced. When the idea of a robbery habitually brings up the idea of imprisonment, there will be less room for the idea of the loss suffered by the person robbed to present itself in. The whole current of thought has been turned in a different direction; its course can only be changed by blocking up the old channel, and excavating a new one. Penal sanctions must be suspended before ethical sanctions can come into play. It was precisely when rich and educated Athenians had succeeded, by the exercise of rhetorical skill, in turning the *dikasteries* into instruments of robbery and murder, when they had ceased to believe that the gods existed, or believed that their forgiveness could be purchased, and when public opinion had been corrupted into a worship of success, that Plato came and filled up the void by a moral doctrine more disinterested than any taught before. Mr. Spencer seems to have felt some difficulty about the matter, for in the very next paragraph he uses phrases with an altogether different meaning. The moral feeling and correlative restraints have "disentangled themselves" from the feelings and restraints due to authority. These latter have maintained the conditions under which they evolve.¹ With the aid of penal sanctions, a stable community is produced, and in this community (remarkably enough) experience is accumulated of the painful effects caused by aggressions sufficient to "generate that moral aversion to them constituted by consciousness of their intrinsically evil results". But how comes this particular consciousness to constitute an aversion? This, the most vital question of all, is left unanswered. Yet the savage who puts an enemy to death by slow torture not only understands what he is doing but rejoices over it, knows that he is inflicting pain and inflicts it because he knows it. So with all injurious actions (and there are many of them) where the injury produced is direct and manifest: it must have been mentally represented before the crime was committed, and yet did not operate as a restraint. Further on, we learn that moral feelings are pre-eminently associated with indirect, remote, and general consequences (p. 122). That is only true when the good or evil caused is indirect, remote, and general, and then it is only persons of reflective habits who bring any moral feelings into play on the subject. Moreover, as knowledge of these ulterior consequences goes on extending, all the penal sanctions are made more stringent, so that in this respect nothing remains to differentiate them from the purely moral restraints.

¹ In a previous passage, penal restraints are spoken of as "controls within which the moral control evolves".

But the most important objection of all to Mr. Spencer's derivation is that, if the direct effects of our actions, as represented in imagination, have no influence on the will until they become associated with some feeling, neither can the indirect. Zero can never be increased by fractions or multiples of itself. I have assumed that the co-operation of an associated feeling is required, for Mr. Spencer's whole psychology assumes it. The feeling must also, so far as I can gather, be either pleasurable or painful. Why should such a feeling be aroused by vague ideal representations rather than by vivid concrete images? And what brings it into connexion with either class? And, even granting that ideal feelings of pleasure or pain are excited in the manner described, why should the motives so constituted be considered more moral than any other? A man, let us suppose, is tempted to commit murder. The idea of his proposed victim's death brings up the idea of being hanged himself, which causes a painful feeling, checking the meditated action. The restraint is immoral. If, on the other hand, instead of thinking about the gallows, his mind runs on the bad consequences attending this murder in particular and all murders generally, and if this train of reflection brings up painful emotions, causing him to desist from his project, that is a moral restraint. I cannot see how one is more moral than the other. In both cases the man abstains from an aggression, and is so far commendable. In both cases he is actuated by the desire to get rid of a painful feeling, and is so far absolutely selfish. Nor can I admit that the restraint is in one case an extrinsic, in the other an intrinsic consequence of the represented action. The necessary consequences of murder figure in both chains alike, for it is just on account of those consequences that murder is punished with death; but that those consequences should directly call up painful feelings in one man's mind is fully as artificial, as non-necessary, as incidental an effect, as that they should call up painful feeling through the intervention of an imaginary gallows in the other man's mind. There is this difference that, in the latter case, we find a longer chain of causes; consequently the painful feeling to which it leads up must by the theory constitute not a less but a more moral restraint.

Passing over all these accumulated difficulties, we must ask once more—How come the represented effects of an action to be pleasurable or painful to me when the real effects concern others and not myself? Through the whole of a very elaborate analysis I cannot find any hint at an answer. There is some vague talk about the "pleasures and pains which the moral sentiments originate" (p. 131). But what is a moral sentiment if not a representation combined with a pleasure or a pain, and what else

do we want to act as "incentives or deterrents"? Sympathy, or the feeling produced by witnessing the expression of another's feeling, has been held by some to furnish a sufficient explanation of morality. This theory is, however, not put forward in the *Data of Ethics*, with reason as I think; for sympathy would be too fluctuating a foundation for duty, liable as it is to be expelled from consciousness by any strong self-regarding desire, besides which it has the disadvantage of only being aroused by feelings capable of very vivid representation.¹ According to another theory, acts involving injury or benefit to others come to be associated with pain or pleasure to ourselves from having been first associated with real or imaginary punishments or rewards. The connecting link may drop out, but the association remains indissolubly fixed. Disinterested virtue would then be an illusion, although, no doubt, a very useful one. Before the required connexion could be established in consciousness, we must suppose that a long succession of generations have been committing crimes and suffering penalties—an unlikely hypothesis, seeing that any family so disposed would incur speedy extinction; or that the good man's ancestors have been constantly brooding over sinister designs, but have lacked courage to carry them out. Their cowardice would have been inherited together with their caution, and we should be accustomed more generally than experience warrants, to dissociate courage from truthfulness, honesty and self-control. Mr. Spencer does indeed ascribe the sense of duty or moral obligation in part to an individual or inherited experience of external restraints, but only in part; for he assigns a large share to the superior authoritativeness of highly complex as compared with simple feelings. 'Never trust your first impulse,' said Talleyrand, 'for it is most likely to be a good one.' An evolutionary moralist distrusts it for the contrary reason. But I doubt very much whether the thought of remote consequences weighs more with anybody because they are remote. We submit to present privation for the sake of future indulgence, not because the latter is prospective, but because it can be had on no other terms, and will be great enough to repay our abnegation. So that if this latter element be eliminated, the

¹ "Supposing all thought of rewards and punishments, immediate or remote, to be left out of consideration, any one who hesitates to inflict a pain because of the vivid representation of the pain which crime produces in him, is restrained not by any sense of obligation, nor by any formulated doctrine of utility, but by an association established in his consciousness." —*Principles of Psychology*, vol. ii., p. 620. I do not know whether this passage is to be taken as excluding sympathies from the class of truly moral principles or not. I have not been able to make out any other passage in Mr. Spencer's writings that bears on the subject.

sense of obligation will be exclusively constituted by dread of punishment. Consistently with his own high standard of rectitude, Mr. Spencer believes that, as the true moral motive emerges into greater distinctness, it will tend more and more to dispense with the feeling of coercion, and virtuous actions will be performed entirely for their own sake. Thus the real nature and derivation of the moral motive, properly so called, remains as much a mystery as ever.

How comes it that so clear and powerful a thinker should have nothing better to offer on a subject which has engaged his attention for upwards of thirty years than such imperfect, confused and mutually contradictory conceptions? The cause must, I think, be partly sought in his attempt to reconcile intuitionism and utilitarianism without pausing to consider whether the truth was necessarily divided between them. How the reconciliation is supposed to have been effected will be seen from the following passage quoted by the author himself from his celebrated letter to J. S. Mill on the subject:—

"Corresponding to the fundamental propositions of a developed Moral Science, there have been, and still are, developing in the race, certain fundamental moral intuitions; and though these moral intuitions are the results of accumulated experiences of utility, gradually organised and inherited, they have come to be quite independent of conscious experience. . . . I believe that the experiences of utility organised and consolidated through all past generations of the human race, have been producing corresponding nervous modifications, which, by continued transmission and accumulation, have become in us certain faculties of moral intuition—certain emotions responding to right and wrong conduct, which have no apparent basis in the individual experiences of utility." . . . To which it is added that "the doctrine of innate powers of moral perception becomes congruous with the utilitarian doctrine when it is seen that preferences and aversions are rendered organic by inheritance of the effects of pleasurable and painful experiences in progenitors". (Pp. 123-4.)

It is not very easy to understand what is exactly meant by innate powers of moral perception, or by faculties which are also emotions. Let us suppose that unwillingness to injure others is implied by these terms. If the unwillingness arises from a consciousness of the pain inflicted on others, why have recourse to inherited experience when a single experiment is enough to produce it? If an obscure reverberation of the pain felt by a man's ancestors when they were robbed is meant, how can you prove, first that such a feeling was ever transmitted, and secondly that it would act as a restraint when the positions are exactly reversed, when the robbery brings gain instead of loss? But, be this as it may, the intuitionists will probably decline to be reconciled out of existence, and will continue to maintain that the consciousness of moral obligation has nothing to do with what experience tells about the general consequences of actions.

Utility is not their standard, pleasure is not their motive. They hold that rightness and wrongness are intrinsic qualities of actions which on being perceived become motives to perform or to abstain from them. They believe that man is composed of two natures, a higher and a lower, each having satisfactions totally incommensurable with those of the other, our chief business in life being to develop the higher nature and to keep the lower from interfering with its activity; and without pretending that such a development necessarily adds to our pleasures or diminishes our pains, nay even while inclining to the opposite conviction, they still maintain that it is at whatever cost to be made the supreme rule of conduct. I am not defending their doctrine, nor do I see how it can consistently make a duty of contributing to the happiness of others, any more than hedonism can inculcate self-sacrifice; but I recognise in its affirmation of duty as a purely disinterested motive an important principle having nothing in common with the experiences of utility inherited, or otherwise acquired, into which Mr. Spencer analyses it. Utilitarianism greatly simplifies the ethical problem by reducing all the virtues to one, but in so doing it lets fall, sometimes even denies, the felt element of moral obligation attached by intuitionism to the performance of each separate duty. By a psychological sleight-of-hand one may substitute an estimation of consequences for the moral motive which intuitionism had previously supplied; nevertheless no ingenuity can make a perception of causal relations do duty for an impelling sentiment, any more than feeling can discharge the office of analytical deduction. Nor has utilitarianism anything to gain from an appeal to alleged intuitions which are useless if they coincide with conscious experience, and might be dangerous if they differed from it.

A critic is not bound to put anything in place of the theory whose validity he disputes, but when he has formed a positive opinion on the subject under discussion a statement of it may not be considered irrelevant. It appears to me then that moral obligation is essentially a product of reason. There is a twofold generality implied by its form. We think of it as a command prescribing or prohibiting a certain class of actions to a certain class of persons. But the actions must be of a kind interesting the whole class, and the command must give expression to their common will. Each individual is completely autonomous, he is morally bound by his own will and by that alone. Considered abstractedly as a unit in the community, his will is to repel every injury with which it is threatened.¹ Long before the time has

¹ The question what constitutes an injury is reserved. I am not satisfied with the utilitarian explanation, but have none of my own to offer in place of it.

arrived for him to take an active part in life he has learned by language, literature and express teaching to think of the group to which he belongs under an abstract conception which makes its homogeneity more evident, of the injuries threatening it under abstract conceptions which aggravate by generalising their danger. Thus the laws made by society in self-defence have beforehand enlisted his full approval, and he would be ready to re-enact them were they repealed. Each new aggression reawakens the accumulated odium of past misdeeds. Each new victim presented in varying circumstances helps by essential similarities to bring out more distinctly the type of a common calamity with which all can sympathise. Should such a man be afterwards tempted to commit a crime, his practised reason would immediately classify it as such, and the moral restraint is this, that the law forbidding crime exists within as well as without him, having become by repeated adhesions the expression of his own will; in violating it he violates his personal continuity so that his former self, the higher, the social, the disinterested self, rises up against him as his accuser and his judge. Conversely, if it is a virtuous act needing self-sacrifice to perform, his resolution is strengthened by the habit of applauding such acts when they were reported to him as the achievements of others for whose efforts he was accustomed in imagination to substitute his own. Briefly, our principles are formed when we are personally disinterested but abstractedly interested as members of a class; they are put in practice when we become interested in the former capacity while remaining relatively disinterested in the latter. If conscience arises from sympathy it is not from sympathy with the possible sufferings caused by our misconduct, nor yet with the disinterested spectator imagined by Adam Smith, but from sympathy with our own former selves and with their sympathy for others.

It remains to point out as concisely as may be how the felt obligations of truthfulness and chastity can be explained in accordance with the principle here suggested. Where these two virtues are accepted as such on utilitarian grounds, no separate explanation is needed. It has to be shown why their imperativeness should be recognised apart from any external sanction by those who do not accept the greatest-happiness-theory. Well, I think that if we regard moral obligation as a logical compulsion, a desire to be consistent with ourselves, then truthfulness instead of presenting a difficulty will strongly confirm us in our opinion; for it is an agreement of words with thoughts just as righteousness is an agreement of actions with ideas. More than this, it is closely connected with class-fellowship, for a falsehood directly weakens the tie between two persons while confidence tends to

strengthen it. With regard to chastity under the form of conjugal fidelity, it is the observance of a contract, those who break it being significantly called untrue or unfaithful to their partners. When unmarried persons alone are concerned, the obligation is, I apprehend, held to be primarily binding on women and indirectly through them on men. The reason of this distinction is that women are immediately, if not ultimately, more interested in monogamy than men are; their status can only be maintained at a high level by the assurance of life-long companionship and protection. Therefore anyone who surrenders herself on cheaper terms breaks a tacit contract made with the whole sex, who visit her treason with the only punishment in their power to inflict, namely, social excommunication.¹ But the fallen woman herself has assented to this law, and so the agony of Goethe's Gretchen is intensified by remembering that in the days of her innocence she had been as merciless to others as others will now be to her.

A further illustration of the general view here sketched is afforded by the various methods employed to deaden and destroy an inconvenient sense of moral obligation. Habitual criminals with whom the feeling is extinct, if indeed it ever existed, acknowledge no community of interest between themselves and others. They stand altogether outside the class for whose benefit laws are made. Offenders of a milder type allege that they have been unfairly treated, that society has not done its duty towards them; reciprocity of obligation is not observed. Others again argue that all men are each in his own way equally bad; the law-maintaining, law-protected class of our assumption does not exist. Or else the incriminated action is asserted not to be rightly classed, it does not belong to the kind of injury to which it bears such an unfortunate resemblance; or the class itself is not injurious; or the misdeed has been isolated by secrecy so completely as not to count for one; a crow, according to these reasoners, not being so black when you take it out of the rookery. Or, finally, the delinquent pleads strong passion as an excuse, thus admitting that he is not a rational being; with the chain of true personal continuity the chain of obligation snaps.

This account of the moral sentiment differs from that given by Mr. Spencer in preserving the idea of law which in his theory has, I think, been far too much neglected, while on the other hand much too large a space is allotted to the idea of causation. The tracing of remote and diffused consequences seems less likely to call up a crowd of emotional associations than rapid assimilation with other acts of the same kind round which such associa-

¹ Even habitual deference to men and preference of male society on the part of a woman is often fiercely resented by other women as derogatory to feminine dignity.

tions have thickly gathered. And while we cannot think of the purest morality except under the form of a law, so neither can we conceive positive laws, political, religious, or social, as existing without a moral element. They have penal sanctions, it is true, but their strength is due in great part to the voluntary adhesion of those whose conduct they control, acquired by a recognition of their intrinsic rightness. Here also the subject is a potential legislator. The supreme authority whether represented by king or god or public opinion, must after all emanate from the crowd and symbolise its essential unity. Inverting a well-known proverb we may say, *vox Dei vox populi*. We shall also understand more clearly how morality could be evolved out of positive law if we consider it as presenting in a conscious and generalised form something which had been present all along, latent and unconscious under a figurative disguise. External authority also served to define with ever increasing distinctness those classes of persons and actions which, as we have seen, are involved in the idea of moral obligation. Laws react on a community and bind its members more closely together. As certain offences were found by experience to be more dangerous than others they were visited with heavier penalties, and all who could not think for themselves were taught in this manner if in no other to regard them with greater horror. Thus the results of experience were stored up far more effectually in the consolidated traditions of the social organism than in the nervous systems of individuals, where their existence, as must be remembered, is still of an absolutely hypothetical and very problematical character.

We now come to the last ethical question, how can the right end be attained? To all utilitarian moralists this must be a most complex and difficult investigation. For besides the immediate production of happiness there is involved the discussion of two other problems, how to estimate the relative values of different pleasures and pains, and how to decide what share of happiness is due to each person. Mr. Spencer is not responsible for this arrangement of what may be called the economical aspect of ethics, answering roughly to the three heads of accumulation, distribution and exchange under which political economists distribute their subject; but it offers a convenient conspectus of the topics to which nearly half his volume is devoted and which may be expected to occupy a still larger space in the forthcoming parts of his entire work. Adequately to discuss his treatment of the various questions mooted would require a separate review; moreover, not much additional light would be thrown on the relation between ethics and evolution with which we are chiefly interested here. Room can only be found for a rapid indication

of the general argument and of what in my opinion are its most questionable points.

Utilitarianism as expounded by J. S. Mill teaches that in dividing happiness between himself and others, each individual ought to be perfectly impartial, deciding only on the grounds which would influence a disinterested and benevolent spectator. And according to Bentham the greatest happiness of the greatest number ought to be the object of pursuit. Now the happiness of a single person vanishes in comparison with that of the whole aggregate. From these premisses Mr. Spencer concludes that the theory so interpreted is pure altruism. What he means by altruism is not altogether clear. It is first defined as "all action which in the normal course of things benefits others instead of benefiting self" (p. 201). Now, first of all, I submit that words ending in 'ism' never denote actions but always beliefs or dispositions. Altruism would then mean the feeling that prompts us to benefit others instead of ourselves, which is not quite the same thing. A further difficulty arises when we find the author at a later stage of his argument using the expression "altruistic pleasure," which ought consistently to mean pleasure benefiting others. However we discover immediately afterwards that it is generated by the pleasure of others, is in fact pleasure at their being pleased or sympathy. Here then is something which is at once altruistic and directly beneficial to ourselves while not necessarily beneficial to others. Nor does the matter end here. Sympathy subsequently becomes a "higher egoistic satisfaction" (p. 243), then again "altruistic satisfaction," then something necessarily remaining "in a transfigured sense egoistic"; "as being part of the consciousness of one who experiences it," but "not consciously egoistic" (p. 250). Finally, we hear that under existing conditions altruism is understood to mean only "self-sacrifice, or at any rate a mode of action which, while it brings some pleasure, has an accompaniment of self-surrender that is not pleasurable" (p. 255). Taking this last definition as the clearest, I venture to say that neither Bentham nor Mill ever inculcated self-sacrifice as the invariable rule of conduct, and that no such injunction can be deduced from their principles. The 'greatest happiness of the greatest number' does not necessarily mean general happiness, but the greatest quantity of felicity whether divided among few or many. Of course, when one has had his fill the total amount can only be increased by a multiplication of happy individuals, but if we have only a limited quantity at our disposal we may *ceteris paribus* give it all to one or divide it in any imaginable proportion among the mass. Mr. Spencer has shown with perhaps unnecessary elaborateness that to give up the means of happy-

ness altogether would destroy life and, if made a universal practice, put an end to the existence of society ; and also that some kinds of pleasure lose their value by being parted with. The inference should be, not that Bentham talked nonsense, but that he did not entertain the absurdity attributed to him. Obviously, the utilitarians mean that I should give up my own happiness when by so doing I can increase the general fund, but not otherwise. I am not bound to give up the fruits of my labour if by so doing I should encourage improvidence and idleness. But if it can be shown that the contribution of a small sum by each taxpayer to defray the expenses of public museums, galleries, libraries and schools produces more pleasure than it takes away, such a redistribution seems quite consistent with the principle of making pleasure the ultimate end of right conduct. When Bentham desired 'everybody to count for one, nobody for more than one,' he simply meant that nobody had a right to keep or to acquire happiness except it could be shown that his possession of it increased or did not diminish the whole existing quantity. Just in so far as self-sacrifice increases the total sum of enjoyment, to that extent is it inculcated by Bentham's school ; and to the same extent Mr. Spencer would appear to be an altruist himself.

When it is asked how the material means of happiness should be distributed among a number of individuals, utilitarianism can give no general answer. A perfectly equal division would obviously create more pleasure than any other that could be fixed on without a knowledge of particular necessities that no government is ever likely to possess. To this course there are, however, two insuperable objections. Of these, the first has long been a familiar argument against socialism. Few men will do their best unless they are paid in proportion to the work performed ; many men will not work at all unless they are compelled by the fear of starvation. The second has been impressed upon us by Mr. Darwin's teaching. Competition, by favouring the most capable individuals, tends to raise the general level of humanity, which would probably remain stationary, or, rather, would fall back, were all to possess equal facilities for living and propagating the species. Unfortunately our industrial and social conditions, as at present constituted, do not necessarily secure the survival of the fittest. A man may be much better qualified to earn money than to spend it with advantage to himself ; or want of education may prevent him from attaining a position where his natural abilities would be turned to the best account ; or the inheritance of a large fortune may relieve him from the necessity of doing any useful work whatever. On the other hand, even heavy taxation, instead of discouraging,

may stimulate the desire to produce, and a corresponding expenditure by the State for purposes of general utility need not foster idleness or improvidence. It is the duty of a wise government, so far as possible, to see that the best qualified persons are selected for the most remunerative employments, and also to diminish the sufferings while developing the usefulness of those whose poverty is their misfortune and not their fault. These are sufficiently trite propositions ; but they show that a disciple of Bentham may consistently refuse to be either driven into an impossible altruism, or into an acceptance of what Mr. Spencer calls equity, which is the liberty of each bounded only by the equal liberty of all, liberty being interpreted to mean (not here but elsewhere) immunity, not only from restraint, but also from all taxation, except what is required for its own defence.

But is altruism itself so impossible and suicidal as is here maintained ? We have seen that the definitions offered of it and of its derivative altruistic are neither very intelligible nor very consistent. The opposite term egoism has not been defined at all, although there is a whole chapter in defence of the activities which apparently it is understood to designate. These, so far as can be made out, are all activities useful to myself. Everyone will agree with Mr. Spencer that we must live before we can act. But never before, that I know of, has keeping oneself alive and well been called egoism. It is easy enough to show that if altruism means neglect of self-preservation, and if it were practised by all, humanity would speedily become extinct. But the altruistic precept, 'Live for others,' might alone have sufficed to rebut such an assumption. We are not told to die for others, although that, too, may be occasionally advisable ; we are to *live* for them. And this shows how important it was to observe that the word by its very form denoted a mental quality instead of a class of actions. Not he who keeps himself alive is an egoist, but he who cherishes his life that he may devote it to self-indulgence. So altruism must mean the disposition to make the good of others our ultimate end, and to value our energies solely as means to that end. At the same time, while continuing to be altruists, we may very well accept benefits from others, and accept them all the more gladly as a proof of disinterested kindness. In a society where division of labour exists, nearly all the work men do is done for others ; altruism would convert this outward fact into an inward sentiment, and while recognising payment as an indispensable condition would not allow it to be the motive of our activity. Mr. Spencer argues at length that if there is a difficulty in deciding what constitutes the greatest happiness for ourselves, a far more insuperable difficulty must be experienced in solving the same

problem for another. That might be true enough if we all stood at the same level to begin with; but the few who can choose their own lives must find that to raise the condition of those about them is practically a much simpler affair than to discover which of the competing enjoyments that solicit them on every side will contribute most to their own selfish gratification.

It appears then, on the whole, that Mr. Spencer leaves the great ethical problems no nearer to a settlement than he found them. He has not brought forward any new arguments in favour of the utilitarian theory, nor answered any of the criticisms which have hitherto been directed against it. Nor do his own strictures on the method followed by other utilitarian moralists seem to be founded on any sufficient reason. He has not satisfactorily analysed the sense of moral obligations, still less shown how it could be generated from lower modes of consciousness. In adopting intuitionism he lets fall precisely those elements which alone enable it to retain a hold on thinking minds. And, at a time when the compatibility even of Mill's doctrine of liberty with utilitarian principles is becoming extremely doubtful, he revives the much more extreme views of the last century, and vainly strives to deduce them from a theory which might as well be invoked on behalf of the most unmitigated despotism that any continental socialist has ever recommended to mankind.

With regard to the connexion between the conscious energy which we call morality and the series of unconscious transformations which we call evolution, there is this much to be said that both are favourable to life and happiness. And of this much we may be certain that no form of felt obligation at war with our permanent good can retain an everlasting hold on our allegiance. Many such obligations have existed in past time; some may be existing still; but all are destined to disappear. Nevertheless, obligation itself will last so long as there are rational beings on this earth, for it springs from the consciousness of our personal identity made intelligible only when reflected in other personalities like and equal to, while differing from, our own. Thus morality is a factor in evolution, and tends towards the same ultimate goal, but evolution alone cannot explain it, for its foundations are laid beneath the ebb and flow of things. It is a part of that eternal synthesis by which we gather up the whole universe from all infinitudes of time and space into oneness with itself and with ourselves, the absolute reality which is more knowable than any isolated phenomenon whatever, since only through it are knowledge and action made possible to man.

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IV.—BOTANICAL CLASSIFICATION.

A PRIME distinction in Botany, as also in Zoology, is that between a Natural and an Artificial system of Classification; but exception may be taken to the way in which it is commonly expressed. "In artificial methods," we are told, "one or two organs are selected in an arbitrary manner, and they are taken as the means of forming classes and orders; while in the natural method plants are grouped according to their alliance in all their important characters." It is further said, that "in giving the characters of any division, we notice merely those which are necessary to distinguish it from others". Now this is objectionable in at least three respects. In the first place, it sets up *importance* as the test or standard, but gives us no test or standard of importance itself. Next, it brings a too strong accusation against the artificial methods of *arbitrary* selection; thereby forgetting that the two systems differ simply in degree and not in kind. Last of all, it confounds between the ideal of the natural method and the botanist's actual achievement; between diagnostic and exhaustive characters—the one sufficient for an Analytical Key or Index, the other indispensable for a natural classification.

It is not, however, with the way in which the above distinction is usually expressed that we are now most concerned. We are more particularly interested in the botanist's practice than in his precept, and what we wish to see is how far he has successfully carried out the laws of classification in his science, and where and in what respects he has failed.

The basis of all Classification is Generality. It is generality that distinguishes a Genus from a Species; and generality, in like manner, distinguishes a Natural Order from a Genus, and a Class from a Natural Order. In Natural History classing we commence with a very wide sweep, and then proceed to narrow by degrees; each successive narrowing constituting a distinct resting-place or grade. The classes themselves, however, in their relations one to another (and similarly the orders and genera) are ungraded: in this respect, they are of coordinate value and do not proceed by the steps of the Porphyrian ladder; higher and lower are words inapplicable to them, and in a Table they would best be placed abreast, or represented by a horizontal line. Nevertheless, orders of distinct classes, or genera of distinct orders, or even different sub-classes or classes have points of community and resemblance: and this constitutes a main difficulty in the formation and location of grades, and necessitates (as we shall see presently) a variety of devices for marking and

presenting the affinities of groups otherwise disjoined and separate.

Now in true logical classing, three things are indispensable:—(1) There must be at least one particular in which all the included members of a group agree—in other words, a class-mark; (2) this class-mark shall not be trivial but essential, which in practice very much amounts to this—that it shall afford us a comprehensive and instructive grouping; and (3) everything that possesses the class-mark shall be included in the group, while everything shall be excluded that is without it. A botanical classification formed on these principles would give us the pure Logical Type. But, unfortunately, a botanical classification formed exclusively on these principles does not attain the Natural ideal, and, when we come to Nature, we must be prepared to strike a compromise. The *second* rule alone (that which has reference to the comprehensive and instructive grouping) seems susceptible of a pretty rigorous application; and it is the difference between a greater and a less attention to it that really constitutes the distinction between a natural and an artificial system, as at present worked. The difficulties in the way are such as these:—Plants appear that have all the characters—say of Dicotyledons, save the one of possessing two cotyledons. The very defining mark is infringed. What then shall be done? Shall we form a separate class of these, or shall they still be reckoned dicotyledons? By accepting them as dicotyledons a certain confusion arises: we extend the denotation of that term at the expense of its connotation; we never can be sure, in any particular instance, simply from the class-name, whether we have here a perfect dicotyledon or not; we are never safe, short of actual inspection. But, on the other hand, to make separate groups of the exceptions, would be to frustrate the very end of a natural classification; it would fail to display the natural affinities or co-relations of plants. And so, a further rule has to be enunciated—one that limits and, where need is, overrides the others. We must classify according to the number and fixity of characters; we must bring together into separate groups the members that display the greatest number of persistent resemblances. This, of course, supposes that we have collected for comparison the particulars to be arranged, and also that we pay a due regard to the differences as well as to the agreements.

Now in the application of this principle, two errors have to be carefully guarded against: first, confining our attention to one *class* of characters, instead of extending it to all; next, confounding between *observed facts* and *our explanations* of them. These caveats are far from being unnecessary. The evils arising from

disregard of the first of them will be abundantly exemplified in the sequel: an instance of the second may be found in Roots, as divided by Richards. Exception is sometimes taken to using this division in classification on the ground that endorhizal roots are adventitious. But the explanation here is one thing, and the circumstance is quite another that endorhizal germination is characteristic of endogens: and for classifying purposes the main question is, not "How do you explain it?" but, "What is the fact? Have we constancy or permanence here, and to what extent?"

From these remarks on the classifying process, it is evident that the arts of Description must play an important part in Botany, as well as simple classification. Indeed, the system of grading would be comparatively useless unless at each step we be presented with a full display of the characteristics applicable at that stage, and unless also we have there and then a note made of the exceptions. It is here also that we ought to have distinctly marked what we may call the *erratic* affinities of the grade, its points of contact with others from which in the schematic form it is necessarily separated, and a note of the palaeontological and other facts that go to make up the real prediction in the matter. Thus, we take the Gymnosperms. These form a Class or Division, according as we view it, by themselves. The first thing to do is, to indicate their class character, with the exceptions. This done, there comes next the geographical, geological, medical and other information—the *real* predicate: on which should be expended as much care as the mineralogists display in the handling of the corresponding field in their department. Then would follow the general relations of Gymnosperms to the other Classes—to Dicotyledons, to Monocotyledons, and to Cryptogams. This might either assume the form of a general note, or it might take the shape of a detailed examination of the order Gnetaceæ, which in so many ways is a *transition* order, and which (more particularly in its genus Welwitschia) shews points of resemblance all round.

Now our contention with the current classifications is that these requisites and laws are but very imperfectly attended to, and that in consequence the science of Botany is devoid of that logical form of which it is otherwise susceptible. It is the aim of a natural classification so to arrange the groups as to display at a glance the natural alliances. Instead of this, there are dislocations and mal-arrangements in the current systems so great as in measure to obscure the alliances. Again, the ideal scheme is that which affords us on perusal a thorough and complete knowledge of any particular plant—which so exhausts the characters and facts at each resting-place as that by collecting the

various descriptions we end by knowing all that is at present known about the individual in question. But nowhere do we find the characters and facts at all points exhausted, or even approximately exhausted; so that, however diligently we search, we cannot gather from works on Botany (not even excepting monographs) the full information we desire. Once more, botanical descriptions are often of the meagrest kind, and injustice is done to lucidity by ignoring the best devices of the descriptive art, and by the failure to keep in separation the "analytic" part of the presentation from the part that is a veritable predicate. These points will become clearer as we proceed.

I.—We shall commence with the obscuring of the affinities by malformation of grades and mal-location.

It might be supposed that, Grades being the very backbone of classification, there would be practical, if not absolute, unanimity among botanists as to the boundary lines. We should *a priori* expect that a law would be laid down regulating with some degree of exactness the amount of resemblance necessary to constitute (say) an Order, and the amount sufficient for a Genus. We might suppose that any great uncertainty in this respect would vitiate the whole process; and what we desiderate is something like an allocation on a numerical or quantitative basis. Now, making all due allowance for the difficulties, and not wishing to be more exacting in the matter than the circumstances authorise, we do think that much more may be accomplished in this direction than has ever yet been achieved. The individual classifier is left too much to the freedom of his own will, to the guidance of his own *taste*; he has been too indulgently allowed to take shelter under the wing of "importance," without being required to define more particularly what constitutes importance; and too little stress is laid on the necessity of *exhausting* the characters—of having them as numerically complete as possible.

We may begin exemplifying from the higher divisions. A good example is found in the heterogeneous collection usually assembled under the name of Monochlamydeæ or Apetalæ, and constituting the fourth sub-class of Dicotyledons; the other sub-classes being Thalamifloræ, Calycifloræ, Corollifloræ. It is tabulated thus, *e.g.*, in Balfour's class-book of Botany:—

Sub-class IV.—Monochlamydeæ or Apetalæ.	{ 1. Angiospermae. 2. Gymnospermae.	a. Spermogens. b. Sporogens.
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Now the objections here are the following:—The classifying-mark is manifestly ill-chosen; it does not naturally afford us a grouping that is both comprehensive and instructive, and the

result is—a most promiscuous collection, containing not only Monochlamydeæ but Achlamydeæ (thereby combining contradictions—a rather difficult feat!). The sub-divisions are founded on the distinction of covered and coverless ovule (*Angiosperms* and *Gymnosperms*), as though there were no angiosperms except such as are either monochlamydeous or achlamydeous. The group of sporogens is in the highest degree anomalous, as the very name indicates; and standing where it does we have the perpetration of a double Irish bull. It is from one point of view a group of sporous sperms, and from another point of view a group of acotyledonous dicotyledons.

Let us see then how and to what extent these faults may be remedied. In pure Logic, the groups require to be mutually exclusive. But we cannot insist on this rule with absolute strictness, otherwise we may lose the prime object of a natural system. There need not, however, be the amount of overlapping, or (to speak botanically) *imbrication*, that is here disclosed; neither need the anomalies be so numerous or so great. For take the above section of Sporogens (Lindley's *Rhizantheæ*), including Rafflesiacæ, Cytinaceæ, and Balanophoraceæ,—and compare their characters with those of Dicotyledons in general; and it will be seen that their affinities are (to say the least) most disputable. The general characters of Dicotyledons are these:—Two cotyledons, exorrhizal germination, exogenous growth, wood in a continuous ring, reticulated venation, quaternary or quinary symmetry. Tried by these tests, the Sporogens are found to be very deficient. In many of the particulars they are at variance (as, e.g., in their spore-like seeds, in their acotyledonism, in the mode of formation of their endosperm); in others (such as their symmetry) they are at partial agreement; in others still, where the affinity is unquestionable, deductions have to be made from the fact when we come to consider *amount* or *degree*. So that, even on general grounds, their position is seen to be unsuitable; and the unsuitability is still further apparent when we descend to particulars, and view them in their setting. For let us compare them with the Spermogens, with which they stand bracketed, and with the Gymnosperms immediately below them: and how do they fare? They share with Spermogens the property of being monochlamydeous; they are also angiosperms: but these two characteristics are not very significant. The connotation of the first is at the best exceedingly trifling, and that of the second (which *might* be very great) is reduced to a minimum by the considerations already adduced. Much more is implied in the differences. They have spore-like seed, with a thalloid development; they are acotyledonous; they are stemless and leafless plants, wholly parasitic in their habits.

Weigh the diversities, and it will be found that they considerably overbalance the agreements.

It is even more difficult to see what near affinities they have with the Gymnosperms. These last form in many particulars a direct contrast. They have naked ovules, they are often polycotyledonous, their embryogeny is thoroughly characteristic, they have peculiarities in their stem tissues, they are achlamydeous, their venation is parallel (occasionally forked, rarely wanting), and altogether they are marked off by so many and such differences that to bring the two into close contact (as above) is to transgress all laws of right arrangement.

Either of two things then must be done. Either the Sporogens must be removed from the graded system altogether, and treated as a group apart; or they must be handled on the plan of double entry. This last seems the preferable of the two. It would give abundant opportunity of displaying their mixed affinities, and it would serve best to bring out the full extent of their anomalous character.

But what now of the Gymnosperms themselves? Is there any propriety in classing them as above, or ought not they too to have a more independent position than is here assigned them? The first thing that strikes us is, that they are achlamydeous, and therefore have a place among the Monochlamydeæ only by courtesy. We next observe that their companion groups are most unfortunately selected; their proximity serving only to obscure the resemblances. But the point of greatest interest and importance is their relations to the Dicotyledons. The affinities here are no doubt strong and numerous. Cotyledonism, exorrhizal germination, exogenous growth, wood in continuous rings, distinct bark: these agreements imply a great deal. But not less striking, and even more suggestive, are the differences. These may be arranged under three heads. They are, first, morphological and structural—such as have reference to the root, stem, leaves, &c.; next, physiological, more particularly those connected with the embryogeny—where the affinity to the higher Cryptogams is so conspicuous; and, last of all, geological—where we have the moment of their appearance in time. The geological evidence speaks for itself. The testimony of the rocks points clearly in the direction of a distinct separation for the gymnosperms. But so does the testimony of the other branches. If we turn to morphology and function, we should have to consider such facts as these:—No true root-cap, neither a true epidermis at the root-tip, mode of formation of tissue in certain respects unique, foliage and flowers uniformly distinguished by their simplicity, peculiar structure of the fruit: above all, we should have to note the embryology and embryogeny, especially in the following particu-

lars:—ovule naked, one-coated (with such and such exceptions); endosperm formed in embryo-sac previously to fertilisation, and embryonal vesicles after fertilisation; several embryos formed in each nucleus, and polyembryony the typical condition; polycotyledonism frequent. To this we should have to add the remarkable features connected with pollination, and the cell-division of the pollen-grain. Now, these peculiarities are numerous and pronounced; and in estimating their value we must not allow ourselves to be drawn off by proffered explanations,—as when we are told that the polycotyledonism is owing to chorisis. Even granting the explanation (which many will refuse to do), the fact remains: it is a peculiarity of gymnosperms, not found in any of the other classes.

Taking then all these things into consideration, we see that the Gymnosperms require a position of great independence. It is not too much to say that they stand on the same level with Dicotyledons and Monocotyledons, and if a class-separation is needed for the one, nothing less will serve for the other.

But now having created a *Class* of Gymnosperms, where shall we locate them? Shall they be placed first of all the Phanerogams, or next the Dicotyledons, or intermediate between the Monocotyledons and the Cryptogams? The maximum affinity, as quantitatively determined, distinctly says the last. The geological evidence is wholly in favour of this, and to this the physiological evidence points as well. We have the proof in the peculiarities already specified; and weight also attaches to the logical consideration that by this means we give an adequate separation to contradictions,—all the phanerogamous angiosperms being brought together and placed in immediate contact *here*, and all the gymnosperms being placed together *there*.

There remain of Group IV. only the Spermogens. The affinities and the differences here are plain enough: and they are clearly such as to necessitate a distinct separation of the section from the other sub-classes. But the defining mark is highly unsuitable, and ought to be replaced by one less arbitrary and more expressive; and the group itself requires a full and careful subdividing.

Passing from the Class-grades, we may next exemplify from the Orders. A testing case is the Convolvulaceæ. In current classifications, it is the habit to rank with these the Dodders (*Cuscutaceæ*), and to make the one a Genus or at most a Sub-order of the other. Now let us work the agreements and the differences, with a view to quantitative determination, and see how it stands. The descriptive characters of the Convolvulaceæ are these:—Plants usually twining (*sinistrorse*); *leaves* alternate, exstipulate; *flowers* regular, with cymose inflorescence; *calyx*

5-cleft, polysepalous; *corolla* campanulate, plaited in bud, gamopetalous; *stamens* 5, alternating with the corolline lobes; *ovary* 2-4-celled, with 1-2 ovules in each cell; *styles* simple, often divided at top, 2 in number; *capsule* 2-4-celled, rarely 1-celled, septifragal; *seeds* large, with mucilaginous albumen; *embryo* curved, with 2 crumpled thin cotyledons. Now compare with these the Cuscutaceæ. They too are twining plants, with 4-5 cleft polysepalous calyx, and gamopetalous corolla; they have 4-5 stamens, and a 2-celled ovary with 2 ovules in each cavity: but their habit is in every way peculiar. They germinate in the soil and afterwards become parasitic: there is no primary root in the Cuscuta and no root-cap. They have a thread-like leafless stem (a fact which has considerable significance); their calyx is coloured like the corolla; *flowers* in clusters, with corolla nearly globular, and small scales alternating with the corolline lobes; *styles* either 2 or wanting; *fruit* either capsular or succulent, with fleshy albumen; *embryo* spiral, filiform, acotyledonous. Surely if a quantitative distinction holds anywhere, it holds here; and an Ordinal separation is required for the Dodders.

Another instance may be seen in the Coniferae. These are often regarded as the first Order of Gymnosperms, the second and only other Order (Gnetaceæ omitted) being Cycadaceæ. Under this system, we have grouped together in various degrees of comprehensiveness—Sub-order, Genus, Section, &c.—plants so very different as Firs, Cypresses, Yews, &c. Clearly this grouping is, from a logical point of view, most objectionable. There are scarcely more marked differences between Coniferae and Cycadaceæ than there are between certain groups of the Coniferae themselves as thus arranged. The characters of the Coniferae, apart from Taxaceæ, are these:—*Resinous* trees or shrubs, with punctated woody tissue; *leaves* stiff, evergreen, linear acrose or lanceolate, parallel venation, sometimes clustered with membranous sheath at the base; *flowers* unisexual and achlamydeous, *males* in deciduous catkins, closely imbricated, each consisting of one stamen or of several united, *anther* two-celled or more, dehiscing longitudinally, often crested above, *females* in cones with closely imbricated scales, no style or stigma; *ovules* one, two, or several at the base of each scale; *fruit*, a cone, each scale covering two seeds with a hard crustaceous spermoderm, sometimes winged; *embryo* often polycotyledonous. Now over against this, let us place the characters of the Taxaceæ. These too are evergreen trees or shrubs, resinous (with peculiar modifications in the secretory organs); they have disc-bearing woody tissue, and are linear in leaf; and, along with certain other resemblances, they are gymnospermous, and, for the most part, the ovules are orthotropous.

and one-coated. But if we look to the *degree* of the property connoted by this last term, we shall find that their organisation differs considerably from that of the Coniferae. They have also marked peculiarities in their embryogeny and in their stem tissue. Their *leaves* are decurrent and alternate, with *venation* either forked or (in Phyllocladus) wanting; branches continuous and inarticulate; *flowers*, diœcious catkins, small with empty imbricated scales at base, *males* terminating in a cluster of stamens (monadelphous), each consisting of 3-8 anther-cells, under a shield-like scale or connectivum; *ovule* single, erect, with a small cup-shaped disc round its base, in Podocarpus and Dacrydium—Sachs's Podocarpeæ—the ovules are furnished with a double integument and are anatropous; *fruit*, a single hard seed, half immersed in a succulent berry-like cup or receptacle; *embryo* dicotyledonous. Thus, notwithstanding their alliances with the other Conifers, their differences are plainly so numerous and such as to warrant an ordinal separation.

Examples might be taken from Genera and Species; but there will be no need. The method in every case is the same, *viz.*, to work the agreements and the differences, and to let the ruling principle (of fixity and number of characters) decide. Moreover, the argument is *a fortiori*. If such be the logical confusion in the higher grades, how much greater must it be as we descend.

Sadly in contrast with the above timidity in giving adequate separation to groups where the circumstances demand it, is the current practice in the treatment of Cryptogams. It is no uncommon thing to find Genera and Orders here constructed on the slenderest basis, and all the form of minute sub-division kept up without the corresponding import. A case in point are the Algae. It does seem unnecessary to array these under all the grades of the classifying process when the separation turns upon so few characteristics—characteristics, too, that frequently do not rise above form, size, and colour! There is a naïve admission to this effect made by De Candolle in his *Laws of Botanical Nomenclature*. After laying down in Article 10 a scheme of twenty-one grades as applicable to the classifying of plants, he remarks in the *Commentary*: "In the actual state of science, it is difficult to ascertain whether the scheme indicated in Article 10 will be quite suitable to Cryptogams".

But even in Phanerogams, we sometimes discern a tendency to over-dividing; as when, *e.g.*, an Order of Deadly Nightshade (Atropaceæ) is formed by Miers distinct from the Order Solanaceæ—the distinguishing feature being the *imbricate* corolline aestivation of the former; or when Henfreyæ is made a Genus

of Acanthaceæ, although it is scarcely distinguishable from Asystasia.

An allied anomaly (found alike in both Sub-kingsdoms) is when an Order is created with a single Genus, or a Genus with a single Species ; the Genus having the same character as the Order, or the Species as the Genus. Examples are—Moringaceæ, Krameriacæ, Equisetaceæ ; Chelidonium, Platystemma, Codon. The reason for this, we are told (at least as regards Genera and Species), is in order to keep up the binominal system of naming. But surely if the system of double naming has any affinity to *per genus et differentiam*, it is simply an abuse to apply it where there is no specific difference, and even if there be no such affinity, it is still an unnecessary formality—worse than useless.

II.—But what now of the setting forth of Grades ? What of the modes of exhibiting the respective characters ?

The first thing that strikes one in the current methods is the want of a systematic separation of the real predicate in a character from the verbal or essential. This is logically objectionable as leading to confusion. Another fault is the perpetual repetition of the same characters under different heads. Thus, we turn up an Ordinal Character, and find it to be so-and-so. On turning next to the Generic, we find it to be in great measure a repetition of the ordinal, and ten to one the greater part of the ordinal appears under the Cohort, or the Class or Sub-class, or perhaps both. A third want, which is both crying and apparent, has reference to the use of the descriptive arts in giving the presentation—more especially of the Table. We may take these points in order.

1. All that may be said about a group or assemblage of plants falls under two heads. Either it is a statement of the structure and function of the members composing it—in other words, an enumeration of the plant processes, with an indication in the particular case of what in them is peculiar and characteristic ; or it is the conveying of certain *ab extra* information about the group—such as their geographical distribution, their properties and uses, their secretions, their geological location, &c. The first is the “analysis,” and answers to a *definition* in Logic ; and the aim should be to make it as exact and full as possible. The second is the real predicate—not of the essence of the thing, but still vastly important ; and needing also to be made as full and accurate as the circumstances will permit. The plan should be, at every grade or step to give (1) the analysis or definition, and (2) the real predicate ; and care should be used to keep the two apart. Thus, we take the Order Ranunculaceæ. The “analysis” (ordinal, as distinguished from cohortal), which is the first thing

to be given, is as follows:—Herbs (except Clematis) with acrid watery juice; *leaves* radical or alternate (except in Clematis), exstipulate (except in some of the Thalictræ); *sepals* imbricated (except in Clematis), deciduous, more than two; *petals* imbricated, sometimes anomalous, occasionally wanting; *anthers* dehiscent longitudinally; *pistil* apocarpous; *ovules* anatropal; *carpels* numerous, unilocular; *fruit* achene or follicle or berry or (in Nigella alone) capsule; *seeds* without an arillus; *testa* in monosperms slightly coriaceous, without prominent raphe,—in polysperms crustaceous with raphe rather prominent; *embryo* minute at base of albumen. Then comes the real predicate, which would assume the form of set composition, and would run somehow thus:—The Order characterise a cold, damp climate. In geographical distribution they are generally diffused through both hemispheres, except within the tropics, where (with the exception of Clematis) they are almost confined to mountainous districts. Of the known species, numbering somewhere about 1200, one-fifth part are European, one-seventh N. American, one-seventeenth S. American, and one-twenty-fifth Indian. Their properties are acrid, caustic, more or less poisonous, very volatile in the foliage and the herbaceous parts, sometimes very virulent in the roots. Last of all, we have a note of the Order's erratic affinities, as, *e.g.*, with Papaveraceæ, Berberidaceæ, and its resemblances, as, *e.g.*, to Rosaceæ, and to (the monocotyledonous) Alismaceæ.

2. It is an error of a greater magnitude when we find the same characters repeated under different heads. Not only is this confusing, not only is it *vain* repetition, but it bespeaks also uncertainty as to the true meaning of a "character," and it betrays greater hesitation as to the gradational limits than need be. If the distinction of grades has any significance at all, if the line can be drawn between them with even approximate exactness, it is of the first importance that each should be presented at its own value: it is a simple mockery to keep up the graded form if the matter and content be not distinct too. Thus, we take a plant (Ranunculus, for instance), a member of Lindley's Cohort Ranales. By that simple fact alone are indicated these particulars:—Besides hypogynous, free petals, we have indefinite stamens, and a minute embryo enclosed in a large quantity of fleshy or horny albumen; and if we took the Cohort Ranales from Bentham and Hooker, we should have in addition—apocarpous gynoecium. Now, these circumstances having been given as the Cohort character, it is absurd to repeat them either under the Order or under the Genus, or indeed anywhere else. Still, if we turn to the ordinal character of the Ranunculaceæ in a botanical authority, the probability is that we shall

find it, among other things, containing this—"Stamens indefinite, hypogynous, &c." "Stamens indefinite, &c.," in like manner appears again under the genus *Ranunculus*, and so forth. Now, we submit, this is worse than superfluous iteration. When we wish to know the generic character, it is the *generic* character we wish to know: we do not there and then desire the ordinal and the cohortal, and perhaps the class or sub-class, too. It is the boast of Botany that, as compared with Mineralogy, its grouping-system is perfect. But *cui bono?* unless the groups be made to serve each their own purpose. Say an ordinal character, is, or ought to be, *that* and nothing else; to introduce it into the generic or specific too is tantamount to saying it is no ordinal character at all.

Closely allied to this is the habit of giving, in descriptions, contradictory alternatives. To say of a plant that its fruit is "either an achene or a capsule" is indeed to tell us something, for there are many other kinds of fruit besides these: although it does not give us the maximum of information on the subject, it still advances us a step, circumscribing the variation within a certain limit. But to say that a plant's corolla is "either regular or irregular," or its leaves "either opposite or alternate," or its embryo "either straight or curved" is really to tell us nothing. The alternatives here are contradictions, and we know without being told it that either one or the other must hold. We can only look upon this form of alternative as a round-about and clumsy way of saying that, so far as this particular is concerned, it affords us no part of the defining mark whatever.

3. Our third point deals with the *presentation* of characters.

It is plain that, if the different groups in a classification were uniformly self-contained, if their members had no affinities except among themselves, and if their differences in the midst of agreements were either few or *nil*, the description and presentation of groups would be a very easy matter. But what we actually find is—plants of the same group agreeing in some points and disagreeing in others, and groups so nearly allied to each other as to justify our placing them together in (say) a Cohort, but having nevertheless in some particulars striking resemblances to others not thus associated with them. In reference to this last case, it is clear that no single method will both meet the requirements and secure location according to the maximum of affinity at the same time. We might occasionally indulge in a double entry, but this would be justifiable only in extreme cases, and when (as in *Platystemon*) the number of the resembling points are pretty evenly balanced on the two sides: it would not be satisfactory to give the method a very wide application. Again, we might have recourse to the diagrammatic

presentation; but this too, from the necessities of the case, is limited. In certain transition groups, it would be necessary to have a special treatment corresponding to the special complications. But the most that can be done, as a general rule, is to note the fact of erratic resemblances (enumerating the resembling groups, and, on occasion, bringing into prominence the salient differences), and then, for the rest, to allow the descriptions at the various grades to speak for themselves. This is, in fact, a portion of the real predicate of a character, and ought to be given in close connexion therewith.

It is different, however, when the resemblances and the differences are within a grade itself. It will then be necessary to view the included members in as many lights as possible, and all available devices must be utilised and welcomed.

Two valuable devices are Diagrams and Formulae. These, as commonly employed, have reference mainly to the reproductive organs of plants; but, even within that sphere, their value is limited. They are usually confined to *types*, and as such fail to mark deviations from the type form. Plates and Figures, again, are useful, more especially when supplementary to diagrams; they have all the advantages of a *picture*, but do not therefore dispense with the necessity of further descriptive expedients. Much value attaches to the "Analytical Key" (proceeding as it does on the principle of bifurcation)—not only as an instrument of diagnosis, but also as a means of exhibiting the affinities. But by far the best method, and the most widely available, is the use of Tables. By this means we are able to work the agreements and the differences to great advantage, and to present them in close contiguity; thereby securing precision to the statement and also producing on the mind a clear and lasting impression. It is a means also of saving repetition.

We may exemplify from the Monocotyledons. Let us take the two allied Orders Cyperaceæ and Graminaceæ, the Sedge Family and the Grass Family. These two are included in the Cohort Glumales. The question is, How shall we present them so as best to display their characters? We take the agreements and the differences and set them over against one another, in the form of tabular contrast. It is particularly desirable to vary the type of printing here, so as to catch the eye and to bring the important points into bold relief; and, for the same reasons, it is desirable that numbers should be marked in figures. AGREEMENTS.—*Flowers* in spikelets; *perianths* either none or replaced by scales or bristles; *stamens* hypogynous, 3 rarely 2; *ovary* simple, 1-celled, with 2-cleft or 3-cleft style, and 1 ovule; *embryo* lenticular. DIFFERENCES:—

	STEM.	LEAF SHEATH.	FLOWERS.	STYLE.	FRUIT.	EMBRYO.
CYPERACEÆ	Solid, nodes in-distinct.	Entire, ligule absent.	Each in axil of 1 bract.	Branches simple.	Pericarp not adherent to seed.	Within base of albumen.
GRAMINACEÆ	Hollow, nodes distinct.	Split open, ligule.	Each enclos-ed between 2 bracts.	Branches feathery.	Pericarp adherent to seed.	Outside al-bumen at its base.

A group of Genera may next be taken. The three Columbine, Larkspur, Aconite (from the family Ranunculaceæ) have many points of affinity and resemblance: they form a generic cohort. Let these be stated once for all in connexion with this cohort, and let the general differences be placed beside them; and then there would remain for special treatment under the separate genera little more than expansions and expository explanations. Thus: COMMON FEATURES.—Herbs annual or perennial; *leaves* divided, with distinct segments; *sepals*, 5 coloured; *stamens* numerous; *carpels* with several seeds; *fruit*, follicles. DIFFERENCES.—Such and such irregularities in the calyx and corolla.

So with Thalictrum and Actea, and other generic cohorts. And *specific* cohorts might be formed in like manner: and for these too the tabular presentation would often be found to be extremely suitable.

It is clear, however, that this method is thoroughly effective only when we can entirely separate the agreements from the differences: nevertheless it is sometimes useful even when that cannot be done. Where, for instance, in a group (say) of three, all the members have a certain number of points in common, but certain others are shared in only by two at a time, the first and third agreeing in this particular, and the second and third in that, and so on,—the Table may still be a welcome expedient. Thus, we take a group of Species from the genus Ranunculus:—*Ranunculus bulbosus*, *R. acris*, *R. repens*. The specific agreements of these three are,—herbs perennial, *leaves* deeply cut, and hairy, *flowers* yellow, *carpels* glabrous. These must be noted by themselves. But an instructive addition may be made by presenting in a tabular form the following *mixed* agreements and differences:—

	CORM.	STEM.	CALYX.	FLOWER-STALK.
<i>R. bulbosus</i>	Present.	Erect without run-ners.	Reflexed.	Furrowed.
<i>R. acris</i>	Absent.	Do.	Spreading.	
<i>R. repens</i>	Do.	Creeping and root-ing scions.	Do.	Slender cylindrical Furrowed.

It is still the same when, for the purpose of obtaining a clearer view of affinities, we bring together groups for comparison on a *single* property; as when we compare the genera of Scrophulariaceæ on the form of the corolla, or genera of the Compositeæ on their common receptacle or on their fruit-achenes.

The tabular device has *degrees* of effectiveness: but, in many cases, it is the best plan that can be adopted; in others, it is the most practicable; and, in others still, it is useful by way of supplement or addition.

III.—We may now conclude by a more specific reference to the *exhausting* of characters: by which we mean, not simply greater completeness in the enumeration of plant processes, but a greater regard to the mode and the degree in which the various plant properties are exhibited. Thus, we take the Coniferae. One distinguishing mark of these is that they have punctated (disc-bearing) woody tissue; but different groups differ in the number of the rows of these and in the disposition of individual discs. Why not note this upon a uniform plan or system? and why not make a point of noting other microscopic structures wherever they occur? Again, there are many variations in the mode of germination and growth of Dicotyledons (compare, e.g., the germination of the common Pea with that of the Cyclamen, or the stem of the Oak with the fasciculated stem of some of the Malpighiaceæ); angiosperms and gymnosperms differ in all degrees in the property connoted by these terms; there are characters of a seemingly trivial and accidental kind (such as "epigeal" and "hypogaeal" as applied to cotyledons) that are nevertheless constant. All these should be attended to (but are not) in the manipulating of characters with a view to classification. The same is true of the law of phyllotaxis—a law that often affords us a means of discriminating species as well as of characterising orders; as also of various other laws explained in Botanical Introductions, but not carried out into Taxological Botany. Again, we have peculiarities in the structure of the root-tip and root-cap, which mark distinct grades. We have at the top those groups of plants that possess the full complement of layers—plerome, periblem, dermatogen, root-cap; and from this we descend through at least four degrees, till we reach the gymnosperms, where we have no true root-cap and no true epidermis at the tip of the root. And still we look in vain for the employment of these peculiarities in the working out of classification. Once more, there are well-marked relations (physical and other) between certain plants and certain soils; so that, from knowing where particular plants grow, we can often infer the nature of the underlying rock, &c. Thus, Pines—although, as we are told, they will grow anywhere, except on chalky for-

mations and in land surcharged with moisture—prefer in their natural state “the débris of granitic rocks, with dry subsoil”; while “sandy loam and cool subsoil” are requisite for Firs. These and all similar facts have to be counted with and registered: and what, in a word, is needed is the consistent practice of marking degree and mode of variation, and of making use of these wherever they attain a constancy sufficient to rely on. It is only thus that botanical practice can ever be assimilated to botanical precept, and the science attain that degree of logical perfection of which it is susceptible.

WILLIAM L. DAVIDSON.

V.—THE METHOD OF KANT.

IT is no longer wise for any writer, having a due regard for his own reputation, to speak of Kant as a benighted “*a priori*” philosopher of the dogmatic type, afflicted with the hallucination that the most important part of our knowledge consists of innate ideas lying in the depths of consciousness but capable of being brought to the light by persistent digging. The labours of recent commentators have compelled us to see that this short and easy method of disposing of the Critical Philosophy is by no means satisfactory. At the same time I cannot help thinking that much of recent criticism rather shows the need, on the part of the critics, of a closer acquaintance with Kant’s writings and mode of thought than calls for actual refutation. I am far from saying that Kant has produced a final system of philosophy, admitting of no development and demanding only a docile acceptance; all that I mean is, that Kant, along with much that is imperfectly worked out and even with some self-contradiction, has given us a philosophy that must be regarded not so much as a rival of English psychology as above and beyond it. I cannot accept so sweeping a condemnation of Kant’s system and method as is contained in the very strong language of Dr. Hutchison Stirling, who regards the system as “a vast and prodigious failure,” and the method as “only a laborious, baseless, inapplicable, futile supererogation” (“These be brave ‘orts’”). So very harsh a judgment, modified even as it afterwards is by the remark that “Kant nevertheless abides always, both the man and the deed belonging to what is greatest in modern philosophy” (*Princeton Review*, Jan., 1879, p. 210), seems to show a plentiful lack of intellectual sympathy on the part of the critic. Kant, in spite of the minor contradictions and the incomplete development of his theory,

has opened up a "new way of ideas," which should win general assent the moment it is seen as it really is. I propose therefore to state in my own way the main points in Kant's theory of knowledge. And, as the Critical Philosophy is most likely to commend itself to living thinkers when brought into connexion with the difficulties they feel in regard to it, I shall interweave with this statement a review of recent criticisms.

Quite recently Mr. Balfour¹ has given us a vigorous criticism of the general method of Kant, which, if conclusive, would virtually foreclose any more detailed inquiry into the merits of the Critical Philosophy. That method he holds to be radically unsound, and its main propositions therefore unproved assumptions. I am aware that Mr. Balfour directs his artillery rather against Neo-Kantians or Transcendentalists than against Kant himself. I cannot of course hold myself responsible for the opinions of all who may be called or who may call themselves Transcendentalists; but, in so far as such writers as Mr. Green and Mr. Caird are concerned, I think I may venture to say that, as they undoubtedly conceive of the problem of philosophy very much as Kant conceived of it and seek to solve it by a method similar if not identical with his, whatever applies to Transcendentalism applies in all essential respects to the Critical Philosophy.

In opening his battery against Transcendentalism, Mr. Balfour has occasion to state the problem of philosophy as he understands it. But unfortunately he has done so in terms that are fatally ambiguous. "The usual way," he says, "in which the Transcendental problem is put is, 'How is knowledge possible?'" . . . But "the question should rather be stated, How much of what pretends to be knowledge must we accept as such, and why?" . . . Now, "if we were simply to glance at Transcendental literature, and seize on the first apparent answers, we should be disposed to think that the philosophers of this school assume to start with the truth of a large part of what is commonly called science—the very thing which, according to my view of the subject, it is the business of philosophy to prove". . . Nevertheless, "Transcendentalism is philosophical, in the sense in which I have ventured to use the term: it does attempt to establish a creed, and, therefore, of necessity it indicates the nature of our premisses and the manner in which the subordinate beliefs may be legitimately derived from them" (*MIND*, XII., p. 481).

Now Kant would certainly have been willing to admit that the problem of philosophy might be thrown into the form,

¹ The remarks that follow, on Mr. Balfour's article on "Transcendentalism" in *MIND* XII., are not intended as a complete reply to that article, but deal only with his general criticism of Kant's method.

"How much of what pretends to be knowledge must we accept as such?" and he would also have admitted that it is the business of philosophy to prove "what is commonly called science"; but he would as certainly have insisted at the outset upon defining more exactly what is to be understood by "knowledge" and "science". For, manifestly, Mr. Balfour's words may be taken in two very different senses: they may mean either (1) that philosophy has to prove the truth of the special facts of ordinary knowledge and the laws embodied in each of the special sciences, or (2) that philosophy must show from the nature of our knowledge that the facts of ordinary knowledge and the laws of the special sciences rest upon certain principles which make them true universally and not merely for the individual. I cannot help suspecting, from the general tenor of his criticism, that Mr. Balfour has allowed these very different propositions to run into one in his mind; so that, having shown, as he very easily may do, that Kant does not prove the first, he rashly concludes him to have failed in proving the second. Surely Mr. Balfour does not seek to lay so heavy a burden on philosophy as is implied in the demand to prove the truth of the special facts of observation and the special laws of the natural sciences, or even the generalisations of empirical psychology. No one, I should think, would seriously ask a philosopher to prove it to be a fact that we have experience, say, of a ship drifting down a stream, or that the three interior angles of a triangle are equal to two right angles, or that bodies attract each other in proportion to their mass and inversely as the square of the distance. Manifestly, if philosophy is to attempt a task of this kind and magnitude, it must go on for ever without reaching any final conclusion, for the special facts and laws of nature are infinite in number. Philosophy has certainly to do with the proof of knowledge, but he would be a very foolish philosopher who should attempt to unite in himself the functions discharged by all the special sciences. "The sceptic," says Mr. Balfour, "need not put forward any view of the origin of knowledge." The sceptic is a privileged person, and of course need not put forward any view about anything; but, supposing him to be reasonable, he will not dismiss without inquiry the view of those who hold that the question as to "the origin of knowledge" is *the* question of philosophy. The follower of Kant, at any rate, must refuse to have the formula which best expresses the problem of philosophy as he understands it, replaced by the very different formula, How much of what pretends to be knowledge must we accept as such? if by this is meant, How are we to show that this special fact or law is true? The special facts of ordinary knowledge and the special laws of the natural sciences are not propositions which the philosopher seeks to prove, but

data which he assumes. Of all our knowledge the conclusions reached by mathematics and physics are those which we have least doubt about; and hence I do not understand how Mr. Balfour can object to the philosopher assuming to start with "the truth of a large part of what is commonly called science". I have no objection to find with Mr. Balfour's assertion, that a philosophy must consist partly of premisses and partly of inferences from premisses. I should certainly prefer another mode of expression, from the fact that the process of inference, according to the account given of it by formal logic, does not allow of any inferences except those which are purely verbal; but, as Mr. Balfour probably only means to say that there are certain facts which do not stand in need of proof by philosophy and certain conclusions which it is the business of philosophy to prove, I am content to accept his way of stating the case. My objection lies against what he very strangely supposes to be the "premisses" of Transcendental philosophy. The actual premisses of Kant are the special facts of ordinary experience in the widest sense, and especially the facts and laws of the mathematical and physical sciences. No doubt the particular philosophical theory we adopt will cast upon these a new light, but it will in no way alter their nature or validity. Should the Kantian explanation of the essential nature of knowledge be accepted, a new view of the process by which knowledge has been obtained, and therefore a new view of the general character of the objects of knowledge, will grow up; but the facts themselves will remain just as they were before. The philosophical theory, that the existence of concrete objects apart from the activity of intelligence by which they are constituted for us, is an absurdity, does not throw any doubt upon the scientific truth, that bodies are subject to the law of gravitation. The evidence for a special scientific law is purely scientific. The philosopher who should attempt, from the general nature of knowledge, to establish a single individual fact or a single specific law of nature, would justly draw upon himself the censure of going by the "high priori roads" leading to the kingdom of shadows. From a general principle only a general principle can be inferred: the proof of a special law demands special evidence. If a philosopher may by an examination of the nature of knowledge establish a single qualitative fact, why should not he evolve a whole universe out of his individual consciousness? If the sceptic is so unreasonable as to ask the philosopher to prove the truth of any law of physics, the philosopher will at once refer him to the physicist: all that he pretends to do is to show that the law is not a mere fiction of the individual mind, but can be accounted for by the very nature of human intelligence. On the other hand, should the philosophical

theory advanced be such as to reduce our knowledge to a mere series of individual feelings, we shall of course have to admit that the facts of individual consciousness have no universality or necessity; we shall, in other words, be compelled to say that there are no facts, in the ordinary sense of the term, but only supposed facts, or, if you will, fictions. It will no longer be safe to say that there is a real connexion between objects, but we may at least say that there is a real connexion between what we ordinarily understand by objects. The empirical philosopher, with the fear of Mill before his eyes, may hesitate to say that two and two are four, but at least he will feel entitled to say that two objects added to other two are for us four.

It may be, however, that Mr. Balfour admits all this. In that case the problem of philosophy will be for him, as for Kant—What are the universal principles which are presupposed in the facts of our ordinary and scientific knowledge? But, if so, I must take the strongest exception to Mr. Balfour's way of stating the "premises" of Kant and his followers. The problem being to show how we may justify the knowledge we all believe we possess by an exhibition of the nature of our intelligence as manifested in actual knowledge, it is manifestly inadequate and misleading to say that the Transcendentalist begins by begging the sceptic to admit "that some knowledge, though it may only be of the facts of immediate perception, can be obtained by experience: that we know and are certain of *something*—e.g., of a coloured object or a particular taste". The Transcendentalist, unless I am altogether mistaken, would not state the matter in this way at all. Kant at least would not ask anybody to admit that he has *just a little* knowledge; much less would he ask him to grant that he has a consciousness of a coloured object or of a particular taste. The difficulty is not at all a quantitative one. Nothing is gained by reducing the facts "postulated" to a minimum, so long as the sceptic is asked to admit a fact at all; and if he does admit such a fact as the immediate perception of a colour or a taste, why should he refuse to grant the carefully established laws of the special sciences? Is the evidence for the consciousness of the law of gravitation less urgent than the evidence that a coloured object is perceived? What the sceptic should object to is not the mere *number* of facts assumed as true, but the assuming that *any* facts are true, in the sense of being more than the assumptions of the individual. What I object to, the sceptic may say, is the assumption that the particular facts and laws which no doubt exist in our consciousness, are universally and necessarily true; I ask you therefore to prove the supposed absoluteness, objectivity, or necessity—state it as you please—of these facts and laws. The request is perfectly

reasonable, and the father of Transcendentalism claims that he has in all essential respects resolved the sceptic's doubt. It is in the process by which he endeavours to prove that there are universal and necessary principles underlying knowledge and making it real or objective, that Kant is led to refer to such simple experiences as the consciousness of a coloured object or of a particular taste ; but he does so, not because he has more faith in such immediate feelings than in the established laws of science, but, on the contrary, because he has no faith in them at all. The argument is indirect, and proceeds somewhat in this way :—If the philosophical theory be maintained that all external concrete objects are *without consciousness*, an attempt must be made to account for knowledge from a mere "manifold" or detached series of impressions—as, for example, the impression of a bright colour or a sweet taste ; and from such an attenuated thread of sensation no explanation of the actual facts of our experience can be given. Kant, in other words, argues that you must *not* suppose an unrelated feeling to be a constituent of real knowledge. Mr. Balfour completely misses the point of the reasoning, and actually supposes Kant to be begging the sceptic to grant him the fact of a little knowledge, in order that he may go on to extract from it a great deal more.

Philosophy presents itself to the mind of Kant with an antique largeness and nobility of conception. Psychology, which with us is usually made to bear the whole burden and strain of philosophical thought, he regards as a special branch of knowledge ranking in scientific value along with chemistry, and standing below those sciences, which, as admitting of mathematical treatment, assume the most precise and the most systematic form. His impulse to philosophise arises in the first place from his interest in such purely metaphysical questions as the existence and nature of God, the freedom of the human will, and the immortality of the soul. His ultimate aim is, in the language of Lewes, to lay the "foundation of a creed". But he soon discovers that, in our common knowledge and in the mathematical and physical sciences, certain principles are tacitly assumed, which are not less metaphysical than those commonly bearing the name. We are perpetually making use, for example, of the principle of causality, and the natural philosopher assumes the truth of such propositions as the indestructibility of matter. Thus an examination into the nature of human knowledge is forced upon us, both as a means of determining the limits of our real knowledge and of justifying, if that be possible, the universal and necessary principles which are embedded in ordinary experience and the special sciences. Until we determine the essential conditions of human know-

ledge, it seems vain to attempt the solution of the more ambitious problem as to supersensible realities. Hence Kant seeks, by starting from what every one admits, to discover whether or no those purely metaphysical questions are capable of any solution. And it is his special charge against all previous philosophy, that, from neglect of this preliminary criticism, it has fallen either into a dogmatism that can give no reason for its existence, or into a scepticism that can only be a temporary phase of thought. His aim is thus in one way dogmatic, but it is a dogmatism which comes as the crowning result of a critical investigation of the nature of knowledge, enabling us to distinguish demonstrable from indemonstrable or problematic assertions. The *Critique of Pure Reason* undertakes the preliminary task of determining what are the ultimate constituents of knowledge, and this cannot be done without drawing in outline the sketch of a true metaphysic, the details of which, as Kant asserts, can easily be filled in by any one who has firmly apprehended its main features. Hence we are told that "we must have Criticism completed as a science before we can think of letting metaphysics appear on the scene" (*Prolegomena*, Vorrede, p. 9, ed. Hartenstein). Metaphysic is thus compelled to undertake a kind of investigation which is not required in other branches of our knowledge. Other sciences may probably occupy themselves with the agreeable task of increasing the sum of knowledge; metaphysic before it can make a single dogmatic assertion, must first prove its right to exist. Failure to apprehend this fact has led in the past to aimless wandering in the region of mere conjecture, and to the continual alternation of over-confident dogmatism and shallow scepticism. The first and most important task of philosophy is therefore to prove that there are metaphysical propositions implied in our ordinary knowledge, which can be established upon a secure foundation; and, as it turns out, that the propositions ordinarily known as metaphysical do not, at least by the theoretical reason, admit of either being proved or disproved. Thus the inquiry into the nature of knowledge proves to be at the same time a discovery of the limits of knowledge.

The first problem of Critical Philosophy—one that is necessarily bound up with the second—is, How can there be any knowledge of real or objective existence? The question, as Mr. Green has pointed out, is not, *Is* there real knowledge? but *How* can there be real knowledge? It is true that we may give a meaning to the first question by interpreting it to mean, as Mr. Balfour does, How am I to distinguish real from pretended knowledge? but, on Kant's view, this is only another and less definite way of asking how knowledge is possible. For we can

only separate real from apparent knowledge by pointing out what are the essential conditions of there being any real knowledge for us, and this is just another way of asking, How is knowledge at all possible? By determining what are the conditions of knowledge, we at the same time determine indirectly what is not real knowledge. Now, an inquiry into the nature of knowledge must in some way comprehend all the facts that make up the sum of knowledge, and hence, to find the problem workable at all, we must get these facts into a convenient and portable shape. But this has in large measure been already done for us. Our common-sense knowledge of the world of nature and of the world of mind has been carried up into a higher form in the mathematical and physical sciences, on the one hand, and in psychology, on the other; and from these we may therefore start as from facts that every one admits. Thus the general and somewhat indefinite question, How is knowledge possible? breaks up into the two closely connected questions, How is mathematical knowledge possible? and How is scientific knowledge possible? We are not here concerned with the special truths of mathematics or physics or even psychology, but only with the necessary conditions without which there could be no mathematical or physical or psychological knowledge. The special truths of these sciences we assume to be true: they are the facts from which we start, not the conclusions which we desire to reach. Our object is to discover, by a consideration of the nature of human intelligence, what are the essential conditions without which there could be no sciences of mathematics, physics and psychology. What hypothesis, then, are we compelled to adopt, assuming the truth of these sciences?

As to Kant's method of solving this problem, we may say that, like the scientific discoverer, he sought for an hypothesis adequate to account for the facts in their completeness. The only exception that may properly be taken to this way of putting the matter is, that it is not so much a statement of the peculiar method of Kant, as of the method by which all knowledge is advanced. It is rather a truism than a truth, that the discoverer must cast about for some hypothesis that will harmonise with the facts he is seeking to explain. The merit and characteristic difference of Kant's method lies not simply in setting up tentatively a hypothesis and testing it by admitted facts, but in the comprehensiveness with which he has stated the problem of philosophy, and in the special solution he proposes. Like all discoverers, he began with certain facts which he sought adequately to explain, and, like them, he was assisted in making his discovery by observing the failures of his predecessors. This accounts to a great extent for the peculiarities of his mode of

statement. All through the *Critique* he combines with a statement of his own theory of knowledge a polemic against the theory of others. This union of exposition and criticism makes it peculiarly difficult to follow the course of his thought. In a sense his method is dialectical ; that is to say, he brings forward certain propositions as if they were precise statements of his own theory, when in reality they are merely stages in the gradual evolution of his thought. Thus he not infrequently speaks of "sensible objects," or "objects perceived by the senses," as if sense of itself were an independent source of knowledge, instead of being merely, in the critical meaning of the term, a logical element in knowledge. So also he speaks of an abstract conception and a category, of an analytical judgment and a synthetical judgment, and of "experience" in its simple and in its philosophical sense, as if each of these terms belonged to the same stage of thought. In truth it must be admitted that Kant was, to some extent at least, the victim of his own mode of statement ; for while he always keeps the ordinary conceptions in regard to knowledge distinct from the purely critical formulation of it, it cannot be said that he has completely harmonised in his own mind the two very different points of view.

The distinction, then, between the data from which he starts and the philosophical theory by which he endeavours to account for them, is never absent from Kant's mind. It does not seem to have occurred to Kant that any one would refuse to admit that mathematics, physics and psychology do as a matter of fact contain propositions that are true within their own sphere. Repeatedly he states this assumption in perfectly definite language. Mr. Balfour himself quotes from the *Critique* Kant's remark, that "as pure mathematics and pure natural science certainly exist, it may with propriety be asked how they are possible ; for that they must be possible is shown by the fact of their really existing". And many other passages might be cited to the same effect. Thus he remarks, in the *Prolegomena* (§ 6, p. 29), that pure mathematics is "a great and well established branch of knowledge" ; and, again, in speaking of Hume's mistake in supposing mathematical judgments to be analytical, he remarks that had Hume but seen that his onslaught on metaphysic was virtually an attack on mathematics as well, the good company into which metaphysic would thus have been brought would have saved it from the danger of a contemptuous ill-treatment, for the thrust intended for it must have reached mathematics, and this was not and could not be Hume's intention" (§ 4, p. 20). Kant was mistaken about Hume's "intention," as Mr. Mahaffy and others have noted, but as to his own opinion

there can be no possible mistake. But perhaps the clearest passage of all is that in which he says that "pure mathematics and pure science of nature had no occasion for such a deduction as we have made of both for *their own* safety and certainty, for the former rests upon its own evidence, and the latter upon experience and its thorough confirmation. Both sciences therefore stood in need of this inquiry, not for themselves, but for the sake of another science, metaphysic" (§ 40, p. 75). Kant therefore invariably assumes the truth of the mathematical and physical sciences, and only asks how we are to explain the fact of such knowledge from the nature of knowledge itself. It is true that he qualifies this unlimited statement, so far as to admit that the special sciences are ultimately dependent for their truth upon philosophical criticism; but the qualification applies, not to the special truths which form the body of those sciences, but to the universal principles which they take for granted, and which, strictly speaking, belong to metaphysic. "The possibility of mathematics," he says, "may be conceded, but by no means explained without [metaphysical] deduction." That is to say, while no one can doubt that mathematical judgments are universal and necessary, this must be an article of faith, until we discern philosophically the ground of their universality and necessity. But this does not mean that proof is demanded of the special truths of mathematics, but only that, in accounting for knowledge, we must find out the secret of their universal character. Kant's problem is therefore the purely metaphysical one as to the objective validity of the knowledge we possess, not the scientific problem as to the evidence for the truth of special laws. No doubt, Kant would have admitted that a failure to account for the possibility of real knowledge must throw doubt on the absolute truth of the conclusions of mathematics and physics, since these sciences cannot get along without making use of principles which they do not seek to prove; but Kant's attitude toward the scepticism of Hume and his unwavering faith in the truth of the sciences show us that his conclusion in that case would be, not that science has no truth, but that the metaphysical theory propounded is marred by some inherent flaw. The extreme scepticism which Mr. Balfour's language suggests would have seemed to him a voluntary creation of self-tormenting difficulties. The truth of mathematical definitions as such was in his view necessarily mathematical, and of physical propositions physical, and it would have seemed to him mere folly to ask philosophy to prove what no one denies: it is surely enough, he would have said, if I show that my system is consistent, and alone consistent, with the undoubted truths of mathematics and physics.

In developing his proof, as has been said, Kant was warned by the utter failure of previous dogmatic systems—a failure which he regards Hume as having proved beyond dispute, so far at least as the principle of causality is concerned—that the mode of explanation must follow a completely new track. The inherent vice of those systems betrays itself in the double defect (1) that it assumes knowable objects to exist, in the fulness of their attributes and in their relation to each other, quite independently of our intelligence ; and (2) that, as a consequence, it supposes that we can by mere introspection or analysis obtain judgments which hold good of things-in-themselves, and are therefore true, not merely subjectively or for us as individuals, but objectively, *i.e.*, universally and necessarily. This twofold assumption is a characteristic mark of dogmatism. In the statement of his own theory, Kant starts from the dualism of knowledge and reality, and seeks to develop a true theory by a gradual transformation of the false theory. Adopting the objection made by Hume against the ordinary proof of causality, and expressing it, to borrow the language of mathematicians, in its utmost generality, he points out that the principle upon which it goes cannot possibly account for the fact of real knowledge. (1) If, as the dogmatist assumes, known objects are without consciousness and yet are known as they exist, we must, to account for that knowledge, say that we go to them and apprehend them one by one, and also observe that they are permanent, that they undergo changes, and that they act and react on each other. Our knowledge of concrete things, and of their succession and co-existence, is thus resolved into a series of particular perceptions. Philosophically, therefore, the dogmatist tries to account for our knowledge of real objects by saying that they are revealed to us in the individual apprehensions or perceptions which come to us from without. Now, granting in the meantime that things exist without consciousness just as they are known, it is plain, that so far as our actual knowledge goes, and so far therefore as the dogmatist is entitled to affirm, knowledge resolves itself into a succession of feelings or ideas in consciousness. But the most that we can philosophically base upon a series of feelings or ideas is a knowledge of particular objects, particular series of events and particular co-existences. This was what Hume pointed out, so far as the sequence or causal connexion of events is concerned. I observe flame immediately after I have observed heat, and finding this particular sequence repeated frequently in my consciousness, I infer that flame is actually connected with heat, and that the one cannot exist without the other. The inference, however, is unwarranted. All that I can legitimately say is that in my past experience as

remembered, and in this particular experience I am now having, flame and heat occur successively. Individual perceptions of such sequences I have, but the inference based upon them, that these could not be otherwise, arises merely from the nature of our imagination, which illegitimately goes beyond the immediate perception, and converts it into a universal rule. On perception, as we may say, generalising Hume, no judgment in regard to the existence of real objects, or of their connexion or co-existence, can properly be founded. The reality of the objects, or of the relations of objects, as a judgment is something that *we add* to perception, not something actually in perception. (2) This leads us to ask whether we are more successful when we attempt to prove the permanence, the causal connexion, or interaction of objects, from conceptions instead of perceptions. Now conceptions are for the dogmatist, simply ideas in the mind, which are completely separated from things without the mind. The conceptions of the permanence, the changes and the mutual influence of substances, are separated by an impassable gulf from substances themselves. It is thus perfectly evident that we cannot legitimately pass over from the conception of a substance to the substance itself. Completely shut up within our own minds, we shall vainly endeavour to break through the walls of our prison. We can certainly frame judgments in regard to the ideas which exist in our minds, but we cannot show them to have any application to real objects or events. Thus, having the conception of substance, we may throw it into the form of the judgment, "Substance is that which is permanent". Such a judgment is no doubt correct so far as our conception is concerned, and is even necessarily true, in the sense that it is free from self-contradiction or conforms to the logical principle of identity, but it has no demonstrable relation to the real substances we suppose to exist without consciousness. All that we have done is to draw out or state explicitly what was contained in the conception with which we started, and however necessary and valuable this process may be in making our conception clear, it is valueless as a means of proving the reality of objects supposed to correspond to it. The mere analysis of the conception of substance no more shows that there are real substances *in rerum natura* than the conception of a hundred dollars entitles us to say that we have a hundred dollars in our pocket. Now dogmatism never gets beyond purely analytical or tautological judgments of this kind; the account it gives of the nature of knowledge is such that we cannot understand from it how it is possible to have the experience of real objects or of their connexion. We may therefore sum up Kant's objection to previous philosophy as fol-

lows:—Knowledge of real objects existing beyond the mind, and of their connexion and interaction, must be obtained either from perceptions or from conceptions; but perception cannot take us beyond the consciousness of particular objects as now and here, and conception tells us nothing at all about such objects; hence dogmatism cannot explain the possibility of knowledge at all.

So far Kant has closely followed in the wake of Hume, at least as he understood him, the main difference being that whereas Hume shows the imperfection of dogmatism only in regard to the principle of causality, Kant universalises the criticism and throws it into the comprehensive form. Real knowledge cannot be accounted for from mere perceptions or from mere conceptions. It is in fact the great merit of Hume in Kant's eyes, that he shows with such clearness wherein the weakness of dogmatism lies. All *a priori* judgments, *i.e.*, judgments derived from conceptions, seem to be merely analytical, and therefore, however accurately I may analyse the conception of cause, I can never get beyond the conception itself. The supposition therefore, as Hume argues, that the conception of causal connexion proves a real connexion of objects is a pure assumption. The moment I am asked to explain how I get the knowledge of objects, I must refer to my perceptions, and no perception can entitle me to make universal and necessary affirmations. Expressed in the language of Kant, Hume's difficulty is this: How can the conception of cause be thought by the reason *a priori*, and therefore possess an inner truth independent of all experience? And this question, when put universally, assumes the form, How are *a priori* synthetical judgments possible? Hume indeed does not content himself with pointing out the purely subjective character of the notion of causality, but endeavours to explain how we come to suppose a necessity where none exists; and in this Kant refuses to follow him. A series of perceptions can never yield necessity, for however frequently a given perception follows another we cannot thence conclude that they must follow each other. Our belief in the connexion of perceptions is therefore explained by the psychological law of frequency or repetition: we naturally suppose that what is often associated is really connected, and thus by the influence of custom we confuse an arbitrary association of our ideas with a real connexion of objects. Accepting Hume's criticism of dogmatism, and rejecting his psychological account of the principle of causality, Kant endeavours to show that we can have a synthetical *a priori* judgment of causality, as well as other judgments of the same kind which Hume altogether overlooked.

We can now see why Kant states the problem of philosophy as he does, and what is the general method he is likely to follow in attempting to answer the question, How are synthetical judgments *a priori* possible? As the failure of dogmatism evidently arises from the assumption, which no one prior to Kant had questioned, that objects and events exist beyond consciousness as they are known, it was only natural to ask whether this assumption may not be a mistake. The general answer therefore given by Kant to the problem he has himself propounded, is that known objects, instead of being passively apprehended, are actively constructed by intelligence operating on the material supplied by the special senses. The existence of things-in-themselves is not indeed positively denied, but such things are shown to be absolutely distinct from the objects we actually know. The theory that intelligence constitutes known objects instead of passively apprehending them, is held to be the only theory that explains the facts as a whole. In the development of his proof, we find Kant continually seeking to intensify the persuasiveness of his own solution, by showing the inherent imperfection of the dogmatic conceptions previously accepted as conclusive. His method of proof thus takes, in many cases, an indirect form. All through the first part of the *Critique*, we find him asserting, that unless we admit the activity of intelligence in the constitution of knowledge, we are reduced to a "mere play of representations," or, what is at bottom the same thing, we are compelled to attempt the impossible feat of extracting reality from subjective conceptions. These two things always go together in Kant's mind; the impossibility of justifying universal and necessary judgments from a mere manifold of sense, *i.e.*, from an arbitrary succession of feelings, and the impossibility of accounting for knowledge on the supposition that known objects are things-in-themselves independent of our intelligence. When he proposes to show why mathematical judgments are apodictic and yet refer to individual figures, &c., he points out, on the one hand, that they cannot be obtained by an analysis of perceptions and, on the other hand, that their demonstrative character is unintelligible if we suppose the objects of mathematics to be known by particular observations of sense or by empirical measurements. In proving the principle that the knowledge of permanent substances is one of the conditions of a real knowledge of objects in space, he shows that, apart from the schemes of the "permanent," we can only have a number of unrelated feelings which by no possibility can be identified with real substances; and in confirmation of this criticism he remarks, that the ordinary derivation of permanent things from the conception of substance assumes that an analytical or tautological

judgment is capable of bridging the gulf between individual conceptions in the mind and things-in-themselves. So, in his proof of causality, he seeks to show that our knowledge of a real sequence of events can be accounted for, neither from an arbitrary train of feelings coming one after the other without determinate order or connexion, nor from the mere conception of cause as we find it lying ready-made in our minds; for, in the former case, we are not entitled to say that there are real sequences but only that there are sequences of our perceptions, and, in the latter case, we have no criterion by which to distinguish the conception of cause from an arbitrary creation of the imagination. Again, the existence of a primary self-consciousness he establishes, both on the ground that a succession of states of consciousness, not bound together by a single identical self, will not account for the systematic coherence and unity of our actual experience, and on the ground that the mere fact of having a conception of self as one does not prove the self to be one in its own nature. Lastly, in the "Refutation of Idealism" this indirect method of proof assumes an open and explicit form: the argument being, that the "psychological idealist" can never show that the mere sequence of ideas in the individual mind could give us the knowledge of real substances as permanent; that, on the contrary, we could never have experience of the self as in time, had we no knowledge of real objects in space. It should be observed however that this polemic against dogmatism might be eliminated from Kant's proof without really destroying its intrinsic force. The transcendental proof has assumed this form chiefly from historical causes, and Kant, in stating it as he does, only intends to commend to the lips of the dogmatist the ingredients of his own poisoned chalice. The conclusiveness of the theory does not lie in this indirect mode of proof, but in the completeness with which it accounts for the facts of experience as a whole. Kant might have stated his proof altogether in the affirmative form that known objects must exist in relation to intelligence; and, having done so, the details of the system would have consisted entirely of a presentation of the essential elements of knowledge in their relation to each other. The "manifold of sense," or "flux of sensations," is not, as Mr. Balfour seems to suppose, a ghost of Kant's raising, but the unlaid ghost of dogmatism itself. Transcendentalism "convinces by threats" only in so far as, like every other system of philosophy, it must take some account of accepted systems that differ from it.

If the above is at all a correct account of Kant's problem and method, the objections of Mr. Balfour have been virtually disposed of beforehand. Those objections seem to me to be rather

the difficulties which naturally occur to one who has not yet seen into the heart of the system, but looks at it from the outside, than the sympathetic and luminous criticism of one who, by the very act of mastering and thoroughly assimilating the thought of another, is already, as Fichte remarks, to some extent beyond it. This judgment can only be completely justified by an examination of Mr. Balfour's objections to the proofs of Substance and Causality, and to the "Refutation of Idealism"; but, even without a special consideration of these, one may see that his criticism is destitute of that sureness and lightness of touch which can only come from the closest familiarity with the subject. What the Transcendental Philosophy is called upon to prove is, we are told, that the principles it asserts to be true are "involved in those simple experiences which everybody must allow to be valid" (*MIND*, XII, p. 483). Now, in the first place, there is no need, as has already been indicated, to lay special stress on "simple" rather than on complex experiences. When Kant is speaking of experience as data he has to explain, he places scientific truths on the same level as common-sense knowledge, and with the whole body of experience as thus understood, he contrasts purely philosophical knowledge as a higher consideration of the facts common to both. In speaking of the distinction between mathematical and philosophical knowledge, he remarks, that the essential difference between these two modes of knowledge lies in the fact that the former sees the particular in the universal, and the latter the universal in the particular; and that those thinkers who propose to distinguish philosophy from mathematics on the ground that the former deals with *quality* and the latter with *quantity*, have confused a difference in the objects of those sciences with the true difference, which consists entirely in the point of view from which the objects are regarded (*Kritik der reinen Vernunft*, pp. 514 ff. Ed. Hartenstein). In the second place, Mr. Balfour, unless I misunderstand him, entirely misrepresents the method of Kant, when he speaks of certain "principles"—by which he means, I suppose, such judgments as the permanence of substances, the causal connexion of events and the like—as "involved in" our simple experiences. We may say that the principle, say of causality, is involved in our experience, in the sense that an analysis of our ordinary beliefs will show that as a matter of fact we do suppose events to be really connected together. Everyone is "natural philosopher" enough to know, that "the property of rain is to wet, and fire to burn: that good pasture makes fat sheep; and that a great cause of night is lack of the sun". Mr. Balfour's words may therefore mean that, while everyone has the belief that there is a real connexion between certain known objects, it is

only by a process of abstraction that we learn to throw this belief into the general form of a principle, and to affirm, not that fire is the cause of heat and rain the cause of wetness, but that every event has a cause. I am loath to suppose that Mr. Balfour is under the impression, that the Transcendentalist has no other means of establishing his principles than simply taking our ordinary beliefs, abstracting from the concrete or individual element in them, and straightway baptising the residuum by the name of a "principle". For this is just what Kant means by dogmatism, consisting as it does in the mere explicit statement of what is wrapped up in our ordinary conceptions. By such a process, as Kant points out, we can only frame analytical judgments that do not take us a single step beyond the assumptions with which we begin. And yet it is difficult to resist the conviction that Mr. Balfour has fallen into this mistake, when we find him saying, that the principles of the critical philosophy are the "casual necessities of our reflective moments," which are supposed to be established by showing that they have "always been thought implicitly"; and that "to argue from these necessities [the principles] to the truth of things is to repeat the old fallacy about innate ideas in another form" (MIND, XII., p. 489; cf. p. 484). What these utterances mean, except that Kant and his followers endeavour to prove the truth of their principles by an analysis of their ordinary beliefs and perceptions, I am unable to understand. Kant's doctrine can only be assimilated to "the old fallacy about innate ideas" on the supposition that it assumes certain conceptions as true, and proceeds to "deduce," or set forth in abstract language, what is implied in them. But this is exactly what Kant does *not* do. If he has one merit more than another it is that he has disposed for ever of the supposition that knowledge may be justified by merely analysing the beliefs we happen to possess. Instead of admitting the absolute separation of thought and reality, an assumption underlying and vitiating the whole procedure of dogmatism, Kant maintains that reality is meaningless apart from its relations to thought. Mr. Balfour's mode of statement can be regarded as a correct formulation of the method of Transcendentalism, only if we suppose him to mean that the facts and laws of our whole experience imply or presuppose certain principles belonging to the constitution of our intelligence; and, when it is understood in this way, his objection loses any force it seemed at first to possess. But let us consider Mr. Balfour's criticism more in detail.

Let us suppose the transcendentalist to be asked by the sceptic how he proves the absolute truth of such a principle as that of causality. The reply, according to Mr. Balfour, will consist in begging the sceptic to admit that we "get some know-

ledge small or great by experience"; and, having obtained this very moderate concession, he will proceed to show that his transcendental necessities or principles are involved in it. To take a concrete instance, the sceptic may be asked whether he admits that we have an experience of *change*, and if he assents, the transcendentalist will attempt to show that experience "is not possible unless we assume unchanging substance". Or again, the sceptic, enticed into the admission that we have an experience of real events, is straightway forced to admit that such an experience is only possible if we virtually think of those events as under the law of causation. The essence, then, of the Transcendental method consists in showing, or attempting to show, that, in questioning the truth of such principles as substantiality and causality, the sceptic contradicts himself, since he grants the reality of certain experiences and yet "makes an illegitimate abstraction from the relations which constitute an object". He has therefore either to rescind his admission of the reality of the object, or to admit that a certain principle is involved in his knowledge of it. "He cannot, in all cases at least, do the first; he is bound therefore to do the second" (MIND, XII., pp. 482 ff.).

I acquit Mr. Balfour entirely of any intentional misrepresentation of the Critical Method; but the fact is not the less certain, that he has given, not a fair statement, but a travesty of it. I see nothing, in his way of stating the case, to distinguish Criticism from Dogmatism. Mr. Balfour's criticism of the "Refutation of Idealism" seems to show, that he has not carried his scepticism so far as to doubt the correctness of the ordinary dualism of intelligence and nature. But without appreciating in the clearest way the essential absurdity of this dogmatic assumption, the method of Kant is simply unintelligible. The only way, Mr. Balfour evidently thinks, in which the Transcendentalist can seek to make good his position, is by analysing, after the method of formal logic, the ordinary or uncritical knowledge which we all possess. The Transcendentalist is supposed to reason, that cause, substance, &c., are really thought, although only in an obscure way, by us in our ordinary consciousness. And no doubt this is true enough; but it is not that which constitutes the essential nerve of proof. If this were the sole force of the argument, Mr. Balfour's objection, that the principles are assumed, not proved, would be perfectly sound. The explicit statement of the implications of ordinary experience cannot prove the necessity and universality, or what is the same thing, the objectivity of the principles in question. The ready answer to such reasoning is, that no reflection upon our ordinary beliefs that does not in some way transform the current view of them,

can justify us in asserting that they are laws of nature. What Kant maintains is, that, reasoning back from our actual experience, we perceive that there are certain forms of intelligence without which there could be no experience at all. His method is, starting from our ordinary knowledge of concrete facts, and from our ordinary dogmatic judgments in regard to them, to show that we can never prove the reality of the facts, or the objectivity of our judgments concerning them, so long as we oppose thought and nature as abstract opposites. This Kant endeavours to make intelligible to the dogmatist by saying, that the observation of independent objects owing nothing to intelligence, can never yield real knowledge, because it cannot take us beyond an empirical "is". And this led Kant to say, that, while intelligence may be dependent on separate impressions for its apprehension of the determinate properties of things, it is yet active in combining or relating these impressions, and so constituting them as real individual objects, real events and real coexistences. It is only in accordance with Kant's method of thought to say, that he who maintains the independent reality of things *as known*, and denies to intelligence any share in the construction of that reality, must attempt to account for the knowledge, which we at least seem to possess, without any other materials than separate impressions. What else indeed can there be if we assume that thought has nothing to do with the constitution of phenomenal objects? On the other hand, supposing known objects to exist only in relation to our faculties of knowledge, intelligence must have certain functions of synthesis, which at once combine into unity the detached differences supplied by the special senses, and enable us to explain how we can have a knowledge of objects other than our own subjective conceptions. For if nature exhibits everywhere a system and unity of objects, which have been actively constructed by thought acting upon the manifold of sense, the puzzle which dogmatism completely fails to solve at once disappears; we are no longer perplexed with the essentially unmeaning riddle, How can we pass from conceptions in the mind to objects without the mind? for objects as known have no existence except in relation to the intelligence by which they are made real. The functions of synthesis, or potentialities of combination, we may, if we please, call "relations"; but it must be observed that they are able to operate whether they are brought into explicit consciousness or no. A function is not an "innate idea," but the potentiality of an indefinite number of cognitions. But how do we know that thought has such functions? We know it because the workmanship of thought is manifested in actual knowledge or experience, in so far as we combine and unite impressions, and thus form

judgments about real things. From the fact that we have scientific knowledge, we are enabled to reason back to the functions of thought by which such knowledge is made possible. We do not beg the sceptic to admit that, in our immediate perceptions, there are involved principles which we can discover by mere analysis, and that, unless this is granted, we are making "an illegitimate abstraction from the relations which constitute an object"; but we ask him to explain how there can be a knowledge of objects apart from the activity by which intelligence constitutes them. Kant has no thought of cajoling the sceptic, or anybody else, into the admission that there is a confused metaphysic even in such simple experiences as a perception of colour or a feeling of taste; all that he asserts is, that any one who is earnest in his endeavour to account for our experience in its totality must come to the conclusion that intelligence contributes the essential element in the constitution of the known universe. And those who refuse to accept his theory of knowledge he asks to explain how real knowledge can be derived from a mere analysis of conceptions, or from the perpetual rise and disappearance of individual feelings.

In this sense alone, and not in the sense that each of us has a confused consciousness of the "relations which constitute an object," do Kant and his followers hold that there can be no objects apart from the relations of thought. Mr. Balfour objects, quite in the vein of Locke's criticism of Descartes' innate ideas, that "the majority of mankind have habitually had certain experiences without ever consciously thinking them under the relations" asserted to be implied in them; and, from his point of view, he very naturally objects that, as an implicit thought is "simply a thought which is logically bound up in some other thought," it is "a mere possibility which can be said to have existence only as a figure of speech". The simple reply to this is that when certain relations are said by the critical philosopher to be involved or implicit in ordinary experience, all that is meant is that they are manifestations of the activity of intelligence in relation to its own objects. That the majority of mankind do not consciously bring these relations before their minds only shows that they are not metaphysicians; it does not show that they can know objects which, by definition, are beyond consciousness altogether, and are therefore in the strictest sense unknowable. Intelligence, as Kant maintains, has an essential nature, which comes into operation in our actual experience; but the recognition of this fact must necessarily be made only after actual experience has been had. Mr. Balfour asks how it comes that, "if relations can exist otherwise than as they are thought, sensations cannot do the same" (MIND, XII., p. 488).

The answer of course is that a sensation can only exist as it is felt, whereas a function of thought must operate before we can be conscious of it as having operated. A function of thought, in other words, is in itself a pure capacity or potentiality, the existence of which can only be revealed to us when, in relation to the material which it informs, it develops into actuality. The fact that people are unaware of the part played by intelligence in the combination and connexion of impressions, no more shows that intelligence is a pure blank than ignorance of the calculus on the part of the "majority of mankind," is a proof that the judgments of pure mathematics are untrue.

JOHN WATSON.

VI.—CRITICAL NOTICES.

An Introduction to the Philosophy of Religion. By JOHN CAIRD, D.D., Principal and Vice-Chancellor of the University of Glasgow, and one of Her Majesty's Chaplains for Scotland. Glasgow : Maclehose, 1880. Pp. 358.

THIS is, in many respects, a remarkable book ; and perhaps the most important contribution to the subject with which it deals that has been made in recent years. Its substance was delivered in Edinburgh as the "Croall Lecture" for 1878-9, and it has been recast for publication in the form of a treatise. A strictly speculative work, it appeals to many who are unaccustomed to philosophy ; and it is stimulating, in no ordinary degree, to the advocates of those philosophies which it attacks. In the literature of the subject to which Dr. Caird's book belongs, we meet with so much irrelevant and partisan discussion, that an able and fair-minded treatise, free from the rhetoric of the ordinary religious essay, is as welcome as it is rare. It is also refreshing to find a book enriched with the results of speculative study, and erudite in the best sense of the word, unencumbered with that display of learning which in similar works is sometimes thrust upon the reader's notice.

The real merit of the book, however, does not lie in the satisfactoriness of the results which Dr. Caird has reached, or of the philosophy which he champions ; but in the intellectual breadth of the treatise, its happy suggestiveness, its elevated tone, and the general felicity of the speculative discussion. These portions may be appreciated most by those who are least able to assent to the philosophy.

In a preliminary chapter, the aim or function of Philosophy is stated, and sundry objections to the competency of Reason in the sphere of Religion are mentioned. Although the special ontological theory which the author advocates is discussed more fully in the eighth chapter, entitled "Transition to Speculative Idea of Religion," in this

first or introductory section the keynote of the book is struck—"The peculiar domain of philosophy is Absolute Truth".

"It does not confine itself to finite things, or content itself with observing and classifying physical phenomena, or with empirical generalisations as to the nature and life of man. Its vocation is to trace the presence and the organic movement or process of reason in nature, in the human mind, in all social institutions, in the history of nations, and in the progressive advancement of the world. In other words, so far from resting in what is finite and relative, the peculiar domain of philosophy is absolute truth. It offers to thought an escape from the narrow limits of our own individuality, even our own nationality and age, and an insight into that which is universally and objectively true."

In subsequent chapters, the objections to the competency of Reason in the sphere of Religion are dealt with in detail. In the first place, the limitation of human knowledge to the sphere of the relative and finite is discussed, with special reference to the doctrine of Mr. Herbert Spencer. Mr. Spencer's position is that to think is to condition, and that the sphere of the unconditioned is the sphere of the unthinkable; that a science of the Absolute is a contradiction in terms, because all thought is relative; but that, while the Absolute cannot be known, it remains an uneliminable datum of consciousness. In opposition to this, Dr. Caird maintains (1) that, if we only know the phenomenal, we can never know that it is phenomenal only; that in order to know that anything is limited we must in the first place traverse or transcend the limit; and therefore that we cannot know that we are ignorant of the Absolute, without in some sense knowing that of which we affirm our ignorance. Further (2), we cannot deny that we know the Absolute, and yet affirm on any rational ground that the Absolute exists; therefore the right conclusion from the doctrine of the relativity of knowledge, as taught by Mr. Spencer, is not that we cannot know the Absolute, but that the Absolute does not exist—that it is zero, or nonentity. The disability under which human reason is said to labour is not only chronic but constitutional, inherent in the very structure of the intellect, and nothing can possibly remove it. To talk of an external revelation removing it (as is implied in Mr. Mansel's development of the theory) is to talk at random, because according to the theory it is a native and necessary impotence, and the human faculties cannot even attest the existence of the source whence the revelation comes. If, in short, all existence is relative, then of the Absolute we can predicate nothing. (3) The notion of an absolute absolved from all relations is a fiction of the imagination. The absolute is known *with* the relative, the object *with* the subject, just as the circle implies the circumference, and the north pole the south. If we separate the absolute from the relative, the object from the subject, we have nonentity or zero. Much exists beyond individual consciousness, but nothing exists beyond all consciousness. All objective reality presupposes thought or intelligence; and things have reality for us only in so far as they are thinkable realities. We find rationality in nature. This is the tacit presupposition of science. We find it also in man. And when we ascend above nature and

man, we do not sink into an abyss of inscrutability, but ascend to intellectual unity. We apprehend the ultimate "unity of thought and being" unfolding itself to finite intelligence; because it is "the very nature" of the Absolute "to realise itself in the thought and self-consciousness of finite intelligence". (4) We cannot worship the unknowable. "Awe, reverence, humility" are "not legitimately due to such an object". We cannot revere a divinity that is "the apotheosis of ignorance". A religion that is wholly mysterious is as absurd as a religion that is not mysterious at all. The first step by which thought rises to the knowledge of God may be said to be the negation of the finite, the feeling of the evanescence of the world; but this is only the prelude to the recognition of the real Infinite, which reveals and realises itself within the finite. It is because the infinite intelligence is "essentially the same with my one, though far excelling mine in range and power" that I am led to reverence it.

In a short note appended to this chapter, Dr. Caird deals more in detail with Mr. Spencer's doctrine that we may have "a positive though vague consciousness of the Infinite, as that which transcends distinct consciousness". To this Dr. Caird replies (1) that the Infinite must be either thinkable or unthinkable, either therefore a positive object of thought, or no object of thought at all; (2) that Mr. Spencer confounds the unimaginable with the unthinkable; and (3) that as to the bare category of "Being" which remains after thinking away all its characteristics or qualities, "take it for what it is, we know all about it that there is to be known". To the last of these three points Mr. Spencer might perhaps rejoin that it is much the same as saying we know nothing at all about it. (But it may be better to defer our criticism till a later stage of the argument is reached.)

In his next chapter, Dr. Caird discusses the doctrine of Intuition. He tells us that "religion escapes the grasp of philosophy, if it be affirmed that we have an intuition or intuitive knowledge of its object". The "pretensions of intuition" are in this chapter specially condemned. Intuitionists will doubtless reply that the doctrine of intuition or immediate knowledge is not clearly distinguished from that of rational apprehension; and, in so far as it is distinguished, it is a distinction without a difference, a verbal and not a real contrast. The philosophy which recognises "fundamental principles of cognition," or "primary beliefs," is described as a philosophy which "denies the jurisdiction of reason"; but no attempt is made to show how it does so. Nay, the proposition "we believe in God because we know Him" is contrasted with "rational apprehension," and disparaged. It is even said that the aim of the philosophy of intuition is "to silence reason". This is surely to misconstrue the doctrine in question. No intuitionist worth arguing with abjures or silences reason. He does not even contend for a "knowledge above reason". His intuition is itself a rational apprehension, of which no further explanation can be given; and which is therefore fundamentally, or in the last analysis, mysterious. To represent this as "an attitude of

uncritical certitude," to speak of it as "simple faith," or "the revolt of faith against reason," is to do as signal an injustice to it, as it would be to describe the opposite doctrine, defended in these lectures, as one that refused to acknowledge any ultimate mystery in the universe.

The "rational or philosophic knowledge of God" is described as not immediate, but "mediated". Many will be of opinion that the immediate and direct knowledge of an object is more satisfactory than any knowledge of it that is mediated and indirect; but Dr. Caird has endeavoured to find out the source to which the tendency to rest in immediate knowledge may be traced. He finds that the objections to a mediated knowledge are due (1) to a misapprehension of the function of reason in religion. "Thought or reason" is said to be present as "an underlying element" in religion. But surely, in that case, the immediate intuition which is criticised is not "irrational". If our thought is at first unconscious and uncritical, and we afterwards "turn back to reflect on the significance of its creations, and read into them their rational meaning" (p. 46), that will not prove the intuitional theory of knowledge to be illusory, but rather the reverse. It only amounts to this, that the intuitive and the reflective are two "stages" through which human thought passes; and that, as Principal Caird himself afterwards puts it, "immediate and mediate thought are not rivals". (2) The second objection to mediated knowledge is that it is "narrower and more abstract than intuition". Here it is easily shewn by our author that there is the surface feeling of unity, an elementary and uncritical apprehension of it, which precedes the rational knowledge of unity; and that the latter is "a unity of principle discovered when opposing elements have been reconciled". We "substitute, for the crude unities of popular observation, the real and profounder unities of thought" (p. 49). But wherein is this "final synthesis," by which Thought "reconstructs the reasoned unity of the world" (p. 50), superior to the first apprehension of the Infinite by the intuition which is dishonoured in contrast? We may distinguish certain stages or phases in the apprehension of the fundamental unity of things. There is the instinctive feeling or imaginative surmise of unity, excited in the mind of the poet by the order and harmony of the world. There is the perception of the unity of law arising out of the generalisations of science; and there is the speculative conviction of the fundamental unity of all things. But each of these may be construed as a phase of one and the same intuition. Is the "thought" to which Dr. Caird refers as "reconstructing the unity of the world," direct and immediate thought? Then the polemic against intuition is invalid. Is it "mediated" thought? Then by what is it mediated? Not by itself. By what extrinsic element then is it mediated? And does not the fact of its being mediated destroy its intellectual primacy, and degrade it to a secondary place? It is said to be the high prerogative of "thought" to reconcile the antithesis of things; but if the reconciliation does not lie in the very nature of the things themselves, independent of any thought regarding them, it cannot exist anywhere. The sole need of the reconciliation is due to

the inadequacy and poverty of human "thought". Instead therefore of glorifying Thought as the reconciler, it may rather be considered as the intuitive discerner and recogniser of a prior reconciliation which exists in the very nature of things themselves. We are not told, in this part of the book, to what the "final synthesis" of thought amounts, or how it enables us to reach the firm ground of objective and eternal truth. But we are told, in answer to a third objection, that it is "knowledge which concludes to God by the mediation of some other idea"; and that all the objections to such a mediated knowledge tell equally against the immediate knowledge of Him, if the separateness of the two natures be retained; because all knowledge implies "a conscious relation between the knower and the object known". But then the "process of mediation," by which we are assured that we are able to know the Divine Nature, is described as one "which is contained within that *Nature itself*"; and a "philosophy of religion" is described (p. 52) as "simply a conscious development of the process by which the finite spirit loses its finitude"; while our rational "knowledge of God is, in another point of view, God's knowledge of Himself". Is not this to destroy the individuality of the finite, absorbing it altogether in the infinite?

In Dr. Caird's criticism of the "validity of intuition or immediate knowledge as the ultimate basis of certitude," an advocate of the doctrine condemned might complain of some misapprehension of his real position. Criticism is so inwoven into the statement of the doctrine to be criticised that it does not appear at its best. Thus, the "fundamental position of the intuitional school" is said to be that "any thought, or sentiment, or notion, which I find in my mind, and of which I can give no other explanation or reason, must be regarded as absolute truth" (p. 56). No intuitionalist would recognise his doctrine in this description of it. It would be quite as correct to describe it as the glorification of chance, or as a doctrine of the hazard. It is, however, shortly afterwards redescribed more satisfactorily thus,—"that there is, and must be, beyond all derivative knowledge, certain underived ideas as to what is true and right, which I must accept as their own authentication" (p. 56). In criticising it, as thus defined, Dr. Caird says (1) that "the immediate may not be the underived," which is evident enough, and is admitted on both sides. He says (2) that the "certainty of immediate conviction is purely empirical," which is by no means evident, but altogether the reverse. Doubtless many notions which occur to the mind with an air of spontaneity or self-evidence, turn out to be only "unwarrantable popular assumptions". Arbitrary association, habit, usage, &c., lead the majority of men to interpret their prejudices as intuitions, and it is one of the functions of the intellect to test all alleged intuitions, to let the light of the pure reason and of experience play around them, and finally either to verify or to reject them. Consciousness remains the final court of appeal; but it is consciousness purified, tested, strengthened by thought, and by other things besides thought. But if the "certainty of immediate conviction is purely empirical," does it

fare any better with the "certainty of rational thought"? How does "thought" carry us out of the sphere of contingency into that of necessity, when "immediate conviction" cannot do so? The root of the error lies in the separation of "rational thought" and "immediate knowledge" by an artificial wall or barrier.

Dr. Caird is of opinion that a satisfactory answer is given by those who deny the validity of intuitions, when they say that they do not themselves possess them. But may not the authority and validity of the reason, which he puts in the place of intuition, be similarly questioned and denied? If any one alleges that he has no intuition of the infinite, doubtless you cannot argue with him by appealing to that intuition; but if he says that reason in him does not attest what Dr. Caird says it attests, his position is no better. Experience shows that a proposition which is perfectly luminous to one man, and which may seem evidenced to him by "the light of the pure reason," is absolutely the reverse to many others. Our author says that there are no intuitions attested by the universal consciousness of the race, no two ages in which the same beliefs prevail, and that if we could find anything common to all the ages, it would be "an abstraction which would embrace under a common head the rudest fetishism and the spiritual theism of christianity". It is a misconstruction of the intuitionalist doctrine to represent it as requiring an absolutely uniform attestation throughout the ages; but intuitionalists find no difficulty in discovering a common element which is much more than "an abstraction," in all the stages of human thought and experience. These stages constitute an organic whole, bound together by the subtlest intermediate links of progressive evolution; and it does not follow that the intellectual outcome of an intuition, fundamentally the same in all the stages of its progress, should be a series of absolutely identical utterances; any more than that the beliefs of an individual should always remain the same, if he continues the same individual. Nay, if the outcome of the same intuition differs, and *must differ*, in each individual, the variety which is characteristic of it throughout the ages is a simple development of that necessary difference. On the other hand, as already remarked, the identity which is missed in the case of "intuition," is not found in "thought" or "reason," which is put in its place.

In a subsequent chapter, Dr. Caird says that "universal truths are not truths about which all men agree"; and that it is not "that which is common to barbarism and civilisation, which is most truly human, but precisely that in which civilisation differs from barbarism" (p. 82). "There is not a single idea in the highest religion which remains what it was in those which preceded it. The perfect organism while it comprehends and absorbs, at the same time annuls and transmutes all that pertains to the earlier and imperfect stages of its life." Now, intuitionalists could scarcely wish a better statement of the case, from *their* point of view. It is manifest that an exhibition of the stages, through which the human race has passed in the progress of its civilisation, will not determine the question at issue between the

rival schools. It does not touch the question. Statistics and genealogical tables are of no greater service than hypotheses as to the prehistoric. The fact of development and evolution is a fact signalled on both sides ; but there is no evidence to show that the stage of intuitive apprehension passes into and is *absorbed in* that of rational insight.

Dr. Caird's third chapter is a criticism of the objections to a philosophy of religion, founded on religion being a positive revelation ; while the fourth chapter discusses the necessity of religion. In this latter it is the writer's aim to show, not only that the human mind may, but that it *must* rise to the knowledge of God. He had previously hinted that between Intuitionism (which reduces our moral and religious ideas "to the level of blind and irrational prejudice"), and Experientialism (which makes them "a mere product of association"), there is an intermediate and more excellent way, *viz.*, that of Rationalism (which shows that they are "necessary moments of that organic whole, that eternal order and system, of which universal truth consists, and which is only another name for Him who is at once the beginning and the end, the source and the consummation of all thought and being") (p. 63). But in order to prove that the human mind *must* make the theistic inference, it has to be shown that "finite knowledge, as finite, is illusory and false ; and that all true knowledge contains in it an absolute and infinite element" (p. 86).

This leads to a critical investigation of materialistic theories. Their inadequacy is said to be twofold. (1) Proposing to exclude mind, they really presuppose it. They assume it in the action of physical force, which is in reality a creation of mind. (2) The conception of mechanical force, which is their "master-key" to the universe, is applicable only to inorganic nature, and not to vital phenomena and to consciousness. (It may not be an irrelevant criticism to say that if the former of these replies is correct, the latter is superfluous. If thought or intelligence lies within or behind the concept of physical force, this thought or intelligence is surely all that is needed to explain the higher organised existences and the phenomena of consciousness.) But leaving the sphere of mechanical causation, we find in the organic and vital sphere (1) system or systematic unity, not mere fragments aggregated, but a living coherent whole ; (2) a unity that is self-developed and self-sustained, the productive cause of the unity living on in its effects ; and (3) an objective unity, beyond the observer, the chasm between the two being easily traversed by thought. If, therefore, we find in matter the promise of mind, it is because mind is already working in matter, because we think of matter as "containing in it virtually all that mind is" (p. 117) ; and this is "a view of the world which spiritualises matter rather than materialises mind". The accuracy of this criticism of materialism will be conceded by many who doubt whether it warrants a theistic inference, and who cannot follow the author in the next step of his argument. It may be that thought is seen in Nature—and that is, in other words, to say that there are laws of Nature, or that Nature is intelligible—but the

thought thus recognised in material things, because they are known by the mind, supplies us with a singularly attenuated type of theism. Hence, it is not enough to show that "thought is the *prius* of all things," unless we can also show that this thought is "universal and absolute".

Dr. Caird maintains that in self-consciousness "there is already involved a virtual and potential infinitude" (p. 120). We are limited only by that which is one with ourselves; whereas physical Nature is limited by that which is opposed to itself. The individuality of every separate "thing" in Nature is an individuality which is shut up within itself, and which asserts itself against all that is without or beyond itself. The individuality of "a spiritual intelligent being" is not thus shut up and isolated. On the contrary, it finds "the measure and the value of its own life" in a "growing participation" in the life of Nature and of other spiritual beings. We see ourselves in Nature. Our finitude "returns upon us in the sense of a limit which is being continually removed, only to be continually replaced" (p. 124); and in the distinction between the actual which we are, and the ideal after which we aspire, we presuppose "an identity that is beyond the distinction". Is this a legitimate inference? We cannot see it. The consciousness of our imperfection neither proves that the imperfection will ever be removed, nor that there is a perfect being anywhere in the universe, though it may suggest both of these conclusions.

But the same result is said to be reached in the doctrine that the knowledge of a limit implies the transcendence of the limit. It is supposed that we know the finite and the infinite *together*, just as we know self and not-self. In one sense it is evident enough that our knowledge of a limit proves that the boundary has another side than that which fronts us, a side turned the other way; but that this implies that we have transcended or can transcend the limit is no more obvious than is the assertion that we are ourselves illimitable. It is affirmed by Hegel and the Hegelian school, that our individual self-consciousness involves within it an infinite self-consciousness, that the self-consciousness of the individual is a moment or a momentary phase of the self consciousness of the Infinite. If so, the unity which reveals the diversity is the unity of the Infinite, expressing itself in the successive phases of finite existence; and strictly speaking no consciousness is individual; all consciousness is the phenomenal manifestation of the Infinite and Absolute Self-consciousness. According to Hegel, the consciousness of the finite is, by itself, illusory; and the consciousness of the Infinite is also, by itself, illusory; but the one becomes real in and through the other. That is to say, the addition of two things, each in itself unreal and illusive, lifts them both out of the category of the illusive, and makes them real. But to this consciousness gives no reliable attestation. There is nothing to warrant the assertion that the finite can only know itself in the Infinite, and that the Infinite can only realise itself in the finite. If my individual consciousness is not reliable as individual or finite,

how can its reliability be guaranteed, when it affirms anything as to the Infinite?

To affirm that, in being conscious of a limit, the limit itself disappears, is either to use the term "limit" at the same time in two different senses, or simultaneously to affirm and deny the same thing. There never was any limit, if it can vanish in the very act by which it is known, if it can be transcended in the very experience by which it is realised. This has been skilfully stated by Professor Veitch in the last section of his Introduction to *The Method, &c., of Descartes*. I can easily transcend the limit of one act of consciousness by enlarging its imaginative area, so to speak, in a second act of consciousness; but this second act remains limited by a further similar area. It is in the first act, therefore, that the transcendence must lie, if it lies anywhere. In short, the act must transcend itself; but, in that case, it is manifestly *felo de se*. Neither in the case of transcending the limit of visual perception, nor in transcending the sphere of a desire or that of an abstract notion, is the limit abolished by our being conscious of it. It is quite true that we know opposites in correlation, self and not-self, mind and matter, light and darkness, &c.; but their differences are not abolished in unity, because we know them thus. As Professor Veitch observes, "the moment correlatives are identified, the correlation ceases;" and, with such a doctrine as the basis of our theory of knowledge, its entire fabric disappears in a series of dis-solving views.

We are told that to be conscious of the dualism of mind and matter is to transcend the dualism in a higher unity of thought. How is it transcended? Surely the two notions stand fast in their original antithesis, while they are realised as the opposite phases of a single abiding reality. If they were absolutely identified, if the dualism disappeared, our knowledge itself would disappear.

The boundaries of our knowledge are its least important features. It is its positive and not its negative characteristics that are primary. What it is, is of greater significance than what it is not.

It is said that finite consciousness implies and carries with it the Infinite, just as the notion of finite space implies and carries with it the notion of infinite space. But there is no analogy in this. We are not conscious of an infinite personality as we are conscious of the finite. They are not correlates. We cannot even intelligibly construe to thought the notion of consciousness as infinitely diffused throughout the universe. On what grounds therefore do we infer the existence of a universally diffused consciousness which pervades the universe, and realises itself in the life and consciousness of individual beings? How can we grasp in a single conception our own finite individuality and this all-pervading, everywhere diffused individuality? The Infinite, as *thus construed*, must suppress or extinguish finite individuality. If the finite in itself be mere illusion (as the negation of the Infinite), and if the Infinite in itself be illusion (as the negation of the finite); and if, nevertheless, the Infinite can only realise itself in the finite, evolve and manifest itself thus; and if, further, this is a

process of perpetual development, never wholly realised or completed, the philosophy which affirms it is fundamentally phenomenal, as well as necessitarian. We have process without product, and process inexorably determined by the necessities of evolution.

Principal Caird has worked out the central idea of his book most fully in the eighth chapter, which is entitled "Transition to the Speculative Idea of Religion". In the previous chapter he had very felicitously shown the inadequacy of religious knowledge, in its ordinary or unscientific form, as being (1) metaphoric or pictorial, (2) fragmentary and abstract, and (3) self-contradictory. Here, as in the rest of this treatise, the destructive section is better than the constructive. Dealing now with the idea of unity, he finds that its real nature is not to be discovered by the logical understanding. It cannot be grasped by affirming that there is a common property underneath diverse qualities. It is only reached when we perceive that true unity shows itself *in* diversity. Further, thought can apprehend a unity that is universal, and is universally immanent in things (not an abstraction *from* them); a unity, moreover, which shows itself in a process of development or ceaseless modification of that which is, and which at the same time incessantly returns upon itself; in other words, it advances by way of affirmation, negation, and reaffirmation. In this eighth chapter, we find the Hegelian ontology "inveterately convolved" with another philosophy of evolution, which may be maintained while the doctrine of Hegel is dropped. Thus, it is said, we escape from materialism and from idealism alike, by recognising that neither Nature on the one hand nor Mind on the other is an isolated existence, each independent of the other; but that they are both members of an organic unity. "As Nature is realised Mind, so Mind finds itself in Nature." "Nature is not the bare antithesis, but the reflection of Mind; and Mind discerns itself in Nature, *tanquam in speculo*" (p. 239). What is affirmed in these two sentences is common to the Hegelian and to many other philosophies; but when Dr. Caird goes on to assert that the true Infinite is the organic union of the infinite and the finite; and therefore that, on the one hand, the finite spirit presupposes the Infinite and, on the other, the Infinite contains organic relations to the finite, we find ourselves in a totally different region of thought; and the conclusion to which we are led is not validly deduced from the premisses with which we started. If the true Infinite be defined as the organic union of the Infinite and the finite, the term "infinite," twice used in the definition, must be used in a totally different sense in the two cases. We are carried into cloudland in the assertion that our individual consciousness rests upon a *universal* self-consciousness, the objective reality of which is guaranteed to us by itself. It is said that, in thinking our own individual consciousness and the outward world, we "at the same time presuppose a higher, wider consciousness which underlies them". How so? I may be unable to conceive of the world existing apart from, or outside of, thought (in as much as I cannot get quit of thought of some kind in performing the supposed

act of thinking it away) ; but that will not prove the real and objective existence of an infinite Intelligence ; it will merely prove the imperfection of my faculties.

It is affirmed that the individual can "cease to think his own thoughts" ; and that, by so doing, he "gains himself". Conversely, it is maintained that the Infinite does not suppress or abolish the finite, but presupposes it, and is only intelligible in the light of it. "The idea of God contains in itself, as a necessary element of it, the existence of finite spirits" (p. 252). He is not self-contained in his own being ; but in Him is included all that of which the finite world is the manifestation. God "manifests Himself in the differences of the finite world, and in those differences returns upon and realises Himself". "The knower is also the known," "the knowing subject becomes object to itself" (p. 255). The eternity and the eternal necessity both of matter and of mind is virtually implied in the doctrine here announced. There may be valid grounds for maintaining both of these positions. The eternity of matter and the pre-existence of mind may be philosophically the most tenable of hypotheses ; but they are *necessary* elements in the philosophy of religion here unfolded.

Dr. Caird's criticism of the proofs of the existence of God, and his discussion of the relations of morality to religion, and of the philosophy to the history of religion, are specially interesting and able. In the former section we naturally find the ontological argument of Anselm, Descartes, and Hegel preferred to other modes of proof ; but it is unnecessary to epitomise the argument.

If in this remarkable treatise, the Principal of the University of Glasgow has not succeeded in solving the problem proposed for discussion, he has written a remarkably significant book, which will rank with the best that exist upon the subject. Probably our British theological literature contains no abler or more suggestive volume. Its true value will be recognised, not by the assent which it commands—that is the secondary merit of commonplace books, and the "common-sense" solutions of secondary men—but by the amount of discussion which it evokes, and the attention which it directs to forgotten aspects of the problem with which it deals.

It is a signal benefit to the progress of the race that stress should be laid from time to time on separate sides or aspects of this question. Philosophic progress is secured, not by the prolonged supremacy of any one school, but by the ultimate rise and fall of opposite systems ; and no better proof could be given of the vitality of speculation in Scotland than the existence of a distinct and well-defined Hegelian school within the University of Glasgow. The special interest which the higher Metaphysic has for the Scottish mind, and the close connexion between its problems and those of Religion, were never more happily illustrated than in these Lectures of Principal Caird's.

WILLIAM KNIGHT.

Man's Moral Nature. An Essay. By RICHARD MAURICE BUCKE, M.D., Medical Superintendent of the Asylum for the Insane, London, Ontario. London: Trübner & Co., Ludgate Hill, 1879.

The chief object of this essay is to consider the physical seat of our active, moral or emotional nature; or all that part of the mind not expressed by intellect. Instead of fastening on some portion of the brain for this purpose, the author makes choice of the Sympathetic System of nerves.

The moral nature is analysed into the four states denominated love, faith, hate, fear: a positive couple (love, faith) and a negative couple (hate, fear). These are incapable of being farther analysed; and to them all moral or emotional states are to be referred. The author, however, does not occupy much space with the resolution of our various compound emotions. He regards joy, high spirits, exultation, enthusiasm, and triumph as love and faith in their original non-differentiated form, combined with a more or less compound concept. Grief in a mother for the loss of her child is love combined with the concept death, which concept is farther combined with the moral state, fear. Sadness, low spirits, depression, dejection and despair are compounds of hate and fear in varying proportions, and combined or not with concepts. The fear of death is a remarkable case of inherited association. It would be found advantageous as a preservative of life; and the people that had it strongest would live where others could not. It would tend to become stronger and stronger until such time as the family affections and the sense of duty and religion took its place, at which time people would be ready to devote themselves for a good cause.

The final drift of the book is stated to be, not simply the determination of a peculiar mental and physical coincidence, but the question—Does the central fact of the universe, as it stands related to us, justify on our part fear and hate, or love and faith, or does it justify neither? The answer is to be that it justifies love and faith.

We are first to see the proofs of the thesis that is to connect the moral nature with the sympathetic nerves and ganglia. After tracing minutely the distribution of these nerves, the author asks—Does the sympathetic possess motor functions? The answer is that it is the source of motion to unstriped muscle. Next is it sensory? The reply is negative. The third question is—Does the great sympathetic exercise a controlling influence over the functions of the secreting glands? There can be no doubt that it does, and is the main centre of such control. In cases where these glands have a supply of cerebro-spinal nerves, it is found that the glands are exposed to external injury, as is the case with the salivary and mammary glands, and such nerves have a purely protecting function. The fourth question is—Does the sympathetic influence the general nutrition of the body, and in what manner? Now, although the nutritive processes are a result of chemico-vital selection and cell growth and destruction, it may be affirmed that they are subject to a general supervision of the

great sympathetic system. These four questions are preparatory to the fifth and last. Is the sympathetic the nervous centre of the moral nature? This is answered in the affirmative, for the following reasons:—

1. By common consent, as shown in all languages, our emotions have their seat, not in our heads, but in our bodies. 2. In woman, as compared with man, the intellect is less developed, and the moral nature more developed; while we know that the brain is smaller, and have reason to think the sympathetic system larger; at all events, it is wanted for the two additional organs—the mammae and the uterus. 3. The functions of the sympathetic are *continuous* functions; those of the cerebro-spinal system *instantaneous* and intermittent functions. Now our emotions are continuous, while our thoughts die out and are renewed. 4. The sympathetic is deep-seated; the other system is in connexion with the outer world. In connexion with this contrast, our emotions arise spontaneously from within and are comparatively difficult to express, while the intellectual states are easily expressed. 5. Moral states are simple, as compared with concepts: love is elementary and homogeneous; the concept 'child' is comprised of hundreds of simpler concepts. Hence for emotions a simple nervous system is enough; for intellect, we need all the complexity of the brain. 6. Moral states have a wide range of intensity; intellectual images, although more vivid at some times than at others, have no true range of degrees of intensity. Now the functions of the sympathetic differ chiefly in degree; the flow of moisture in the eyeball knows no other difference but amount. 7. The development of the moral nature is concurrent with large bodies; while great intellects are often found in small bodies. Religious founders and great artists have been men of good height and weight; moral idiots, as far as the author's experience has gone, are often very small men. 8. Other things being equal, the best and highest natures live the longest, showing the highest perfection of the nutritive system, and, by inference, of the sympathetic. The author devotes many pages of statistics to establish this allegation. The force of the argument, however, is weakened by his own admission that the nutritive power is the result of chemical and vital selection and cell growth, with merely a certain indefinable amount of control from the sympathetic system. The statistics relied upon comprehend, first, the Jews; second, persons of eminence as given in a *Cyclopedia of Biography*; third, married persons, who may be presumed to be more emotional than celibates; and, fourth, women as such.

The author then adduces numerous physiological and pathological considerations in support of his thesis. He looks upon the great emotional activity of childhood and youth as a testimony in his favour. There is no unusual cerebro-spinal activity at that period, but rather the contrary; the sensory-motor tract may be in full operation, but it is in connexion with the sympathetic centres, the centres that govern exclusively the emotional outbursts.

The extraordinary mental depression from diseases of the viscera is

regarded as due to the sympathetic system, on which the viscera are dependent for their chief supply of nerves. Addison's disease of the supra-renal gland is a strong case in point; the organ is supplied with an extraordinary number of sympathetic nerves, and the mental depression of the sufferer from the disease is of an extreme kind.

Speaking of the emotional aspects of the senses, the author thinks that hearing is especially an emotional sense, and is so in consequence of its numerous connexions with sympathetic ganglia. Moreover, sounds admit of nearly the same differences as emotion proper—differences in continuity, rhythm and range of intensity.

Again as to the expression of emotion, the author, repeating the usual facts as to the influence of joy, grief, &c. on the heart, digestion, and spasmodic movements, attributes the whole to the influence of the sympathetic centres.

The question as to the precise physical seat of emotion is still an open one; and while Dr. Bucke puts a number of the facts in a new and suggestive light, yet in reaching his peculiar conclusion he makes many precarious leaps. His psychological analysis of the so-called moral nature seems to me to be retrograde; the elements assigned by him do not exhaust the component parts, nor are they precise in themselves. "Faith" is a most equivocal word, although playing a large part in the scheme of his book, as the equivalent of religion. "Hate" he couples with "fear" as a negative state; yet the reasons are very different; hate is a positive passion, although its outgoings come into conflict with those of love; while fear is a negative in the sense of weakness or absence of other powers. Moreover, at this time of the day, I should have thought a ternary division of the mind—action, emotion and intellect—the only one at all tenable.

Dr. Bucke appears to make light of the commonly received view that localises all conscious states whatever in the hemispheres of the brain. It is a curious problem, for which an *experimentum crucis* is still wanting, whether the emotions have specialised cerebral centres, or whether they are associated with the tracks of ideas. I should think the second hypothesis most likely. Nevertheless, the emotional outbursts demand the concurrence of organs outside the brain, such as the viscera with their nerves—both spinal and sympathetic; and consequently have these organs for a condition of their existence, but not necessarily the sole condition.

There is a tendency all through the work to treat as one and the same fact mere animal spirits—the adjunct of healthy nutrition—and emotion strictly so called, as love or anger. This appears to confound instead of elucidating the great problem of the physical and mental. There is also something very loose in treating mere corporeal bulk as a proof of good nutrition, and of a consequent pre-eminence in moral endowment as a whole. We are all aware of Cæsar's dislike to the lean and "dangerous" Cassius, but we are also perfectly familiar with the other conjunction; and statistics has not yet assigned the relative proportion of the two couplings.

A considerable portion of the present work is devoted to an inquiry into the moral progress of mankind, to which the theory above sketched is made instrumental. However we may agree or disagree with the author's views, we always find his expression clear and interesting; and whoever begins the work will be certain to finish it.

A. BAIN.

A Student's Handbook of Psychology and Ethics. Designed chiefly for the London B.A. and B.Sc. By F. RYLAND, M.A., late Scholar of St. John's College, Cambridge. London: Sonnen-schein & Allen, 1880. Pp. viii., 173.

In his Preface, Mr. Ryland defines the aim and scope of his work. The intention has been to provide for examination-purposes a selection of the salient doctrines of Professor Bain's compendium of *Mental and Moral Science*, and to supplement this by quotations or abridged statements from other works which appear to have been consulted by London University examiners in drawing up questions for the Pass Degrees of B.A. and B.Sc. As the aim of the compiler has been "exclusively practical," no discussion of doctrines is undertaken, and accordingly passages from psychological works of the most diverse character are presented indiscriminately for the instruction of the student. Hamilton, Spencer, Sidgwick, Lewes, Calderwood, are drawn upon in turn for scraps which may be utilised by the candidate when he has to face questions implying "a wider range of reading" than *Mental and Moral Science*. A body of references to various writings, and a selection of questions from the examination-papers of the last half-dozen years at London are appended.

An elementary manual of Psychology and Ethics is a work which must make great demands upon the writer. The complexity of the facts is in itself so great, the field of investigation is so wide and so ill-defined, the possibilities of misconception on the part of the student are so numerous, that the most careful and judicious treatment is absolutely requisite if serious harm is not to result from the attempt at conveying elementary instruction. So far as one can judge, this *Manual* does not make the slightest effort to escape even the most apparent pitfalls in the way of the student. Doctrines fundamentally opposed are thrown before the learner without a word as to the deep significance of their differences; the selection of the said doctrines seems to have been determined solely by reference to the examination-questions of the last few years—for in the main the paragraphs going beyond *Mental and Moral Science* contain concise answers to some of these questions; and even the statements of elementary facts are disfigured by carelessness and inaccuracy. The subject of the Senses is one which may be treated successfully if it be strictly guarded, and if the teacher carefully keeps before his students the lines of separation between psychology and physiology on the one hand, and between psychology and theory of knowledge or metaphysics on the other.

Mr. Ryland is entirely neglectful of these precautions, and I can conceive nothing more fatal to the progress of the student than contact with the loose unguarded statements given in this work, e.g., on pp. 22, 23, 36, 42.

The book is so essentially and avowedly a product of the London University examination-system, it is so entirely a piece of *cram* work, that any serious criticism of it is quite out of place, but I feel sure that all who have had experience in teaching elementary psychology will agree in thinking that nothing could be more injurious to the student of philosophy than the attempt to make use of such a compilation.

R. ADAMSON.

An Introduction to Logic. By W. H. S. MONCK, M.A., Professor of Moral Philosophy in the University of Dublin. Dublin University Press Series. Dublin : Hodges ; London : Longmans, 1880. Pp. xvi, 259.

Professor Monck's *Introduction to Logic* consists of two quite distinct portions. The first, and smaller, (pp. 1-89), is a brief and lucid elementary statement of the ordinary logical doctrines; the second, and more important, contains a series of discussions of various questions, partly of logical theory, partly of logical praxis. The several chapters in the second division of the work deal with logical questions in a manner appropriate to a university class in the subject, and appear as though they had formed portions of university lectures. Perhaps from this cause they are somewhat fragmentary, and include matters which might with advantage have been omitted from a treatise intended for publication. Of the practical discussions the most interesting are the treatment of Indirect Proof or *Reductio per impossibile*, and the solution of some of the more famous logical puzzles. As bearing on the theory of logic, the most important chapters are those which deal with the definition of the subject, with the famous distinction between analytical and synthetical judgments, and with Sir W. Hamilton's proposed modifications of the doctrine of judgment and syllogism. With reference to this last problem, the author rightly brings into prominence the essential difference between the collective or numerical and the distributive senses of the quantitative symbols employed in logical expressions, and has little difficulty in shewing that Hamilton proceeds entirely on the assumption that the said symbols have only a collective significance. It is evident that on all these questions, and on others but partially treated by the author, such as the import of terms and propositions, the legitimacy of induction as a form of reasoning, the true function of syllogism in relation to proof, the ultimate decision rests not with formal logic as conceived by the Hamiltonians or by the author himself, but with the more general doctrine which we may call the Theory of Knowledge. The main defect of Professor Monck's work, it seems to me, is the uncertain position of logic as there treated with regard to this general theory

of knowledge. While Professor Monck is compelled on all the cardinal points to have recourse to considerations lying outside the scope of logic even as described by himself, the discussions are not carried to their full extent, nor is the relation of logic to theory of knowledge, the most interesting question in the present condition of the subject, handled in a satisfactory manner.

R. ADAMSON.

VII—NOTES AND DISCUSSIONS.

MR. GALTON'S STATISTICS OF MENTAL IMAGERY.

Mr. Galton's laborious and interesting observations on Mental Imagery¹ contain many results in accordance with our previous theoretical knowledge of the mind, and some that appear startling and paradoxical. I mean to comment at large on these results; but, before doing so, I wish to make a few remarks upon the methods pursued.

It is a laudable object of ambition to extend to the human mind the methods of the physical sciences—Observation, Experiment, and Induction. The researches hitherto conducted on this plan have principally had reference to the Senses; in every one of which we have derived a considerable body of accurate information, not solely confined to the physiology of the organs, but extending to the subjective or mental functions. The experimenter in this walk has always one foot in the object-world; he views subject-states in their rigid concomitance with well-defined variations in the sensory functions, or with definite impressions from outward agents.

Yet even in the actuality of sensation, we encounter the special difficulties of the delineation of subject-states. In the more intellectual sensations of touch, hearing, and sight, we can give precise descriptions, and come to some sort of mutual understanding; as, for example, in plural contacts in touch, in pitch and intensity of sound, in colour and form of visible image. But the purely emotional feelings, those of pleasure and pain, are without definite measure or the means of a common understanding between two observers. There are ways of abating, but not, I conceive, of ever entirely overcoming, this difficulty. It would take a good deal of mutual comparison of experiences to enable me to say whether my sensation of the sweetness of honey or of the malodorousness of assafœtida was the same as another person's.

In passing from the sensation to the Idea, all our difficulties are increased. We are no longer sailing along the shore of the material

¹ See more especially MIND XIX. and the *Fortnightly Review* for September.

organism ; we are in the ocean of pure mind, with only a hypothetical reference to the physical workings. If it be hard to estimate the value of sensation as felt by another party, it is ten times harder to estimate the value of the ideal trace or mental representation of a sensation. But, as in the actual, the case is easier for the intellectual sensations—those that have form and features, like a visible picture ; the ideal feelings corresponding to the pleasurable and painful sensations are much more vague in their estimate than the actual.

The great problem of the Intellectual Powers is the IDEA, its marks, peculiarities and modes, its rise and fall, its enchainment in series, and so on. We cannot be too anxious to discover means of giving it precise expression and definition, taking care not to affect a precision beyond what the case admits of.

The rule being that the Idea is inferior in every way to the actuality, what we want is to be able to state in words the degree of inferiority. Now the idea of an intellectual sensation can be compared with the original, first, in fulness of lineaments or detail, second, in vividness (for sight, "brightness"), third, in easy self-sustaining persistence. The best test of all is the first ; in proportion as the details of the original are represented in the picture, is the mental goodness or merit of that picture. I have little doubt, however, that this vital peculiarity will carry with it a corresponding measure of the others ; the same mental tenacity that suffices for one will presumably suffice for all.

In ascertaining the quality of another person's mind in respect of the strength of some one class of ideas, as of sight, there are various indications within reach. As memory in any walk can be tested by the individual's power of verbal or other mode of reproduction, the recollection of a visible scene may be proved by the ability to describe it, or to make a picture of it. Or we may directly appeal to the person's self-consciousness to inform us of the character of the image as conceived, by a comparison with the actuality. Mr. Galton has chosen the last method in collecting his statistics.

Before remarking upon the results attained in this way, I must endeavour to characterise the drift of the inquiry. At first blush it seems to be nothing more than a determination, by accurate statistics, of the relative preponderance of certain varieties of mind that we already know to exist. If this were all, it could scarcely be called a psychological research ; it would not discover, elucidate, or prove any psychological laws, any more than a statistics of the relative heights, or weights of Englishmen, would give us new psychological insight. Mr. Galton, however, seems at times to regard his observations as bearing upon the advancement of the Science of Psychology. Now, undoubtedly, they might do so, if he were to enlarge their compass somewhat, as I shall endeavour to show.

That certain individuals, A, B, C, have a great or a small visualising memory, is an important fact as regards them ; it determines their aptitude or inaptitude for certain vocations, involving the energetic display of this faculty. It contributes nothing new to science ; the

existence of such variations has been known at all times. Could we, however, devise an easier and more precise mode of ascertaining and expressing this aptitude, we should do a great work, whose outgoings would be both practical and scientific. Farther, if we applied a satisfactory method of measurement to large numbers, representative of entire populations, we should gain a most valuable estimate of the capabilities of men generally for particular walks, and avoid many practical errors of misplaced expectations. The statistics of colour-blindness, for example, has been a warning against employing persons indiscriminately as signal-men.

But to come at once to the point as regards the applicability of Mr. Galton's inquiries to Psychology. A psychological fact or law supposes a concurrence of *two* peculiarities; every law unites two factors. An observation of high or low visualising memory becomes psychology, the moment the property is connected with some second property, as cause, consequence, condition, concomitant, and not till then. The wider interest in determining the presence of some intellectual superiority, is the interest in knowing how to produce it, what things go along with it, and what things are excluded by it. The everlasting problem of education draws its solution from laws of concomitance and causation, not from a bare statement of the fact that a certain individual, A, has a large power of mental representation. Mr. Galton, in discussing the answers received to his questions, incidentally approaches this wider application, but generally he is content with classing and summing up the instances of high, middling, and low power of representation. Indeed, the questions put by him lead to no farther result; only, in some of the answers matter is introduced that can be turned to account in the way of illustrating laws of the mind.

For an investigation of this sort, whether for the narrower purpose of statistics, or for the wider purpose of discovering, correcting, or confirming psychological generalities, everything depends upon the precision of the returns, and that precision again depends in part upon the shaping of the questions. Mr. Galton first directs the subjects of his interrogatories to think of some definite object: "Suppose it is your breakfast table as you sat down to it this morning, and consider carefully the picture that rises before your mind's eye". Now I apprehend that this test is too narrow. In the first place, it is an exceedingly familiar object, and must be clearly and fully imaged by whoever can image anything at all. In the next place, there may be great differences in the degrees of attention given to the minutiae of the table, according as the person is a mere recipient, or plays a chief part in providing and serving the viands. In the third place, it may be a very small, limited, and routine *menage*, or a large, elaborate, and various array. Fourth, we learn a familiar formula for including all the articles on the table, and can recover the details by the help of that formula, which may be a verbal string—cups, plates, knives, bread, &c. All these circumstances make great differences in the vividness and fulness of the mental representation. No doubt, it

is an advantage of obtaining returns from large numbers that individual peculiarities are eliminated, and prevailing distinctions made apparent. Still the result is purely statistical, and has little of the precision needed for psychology.

Instead of a single object I should be inclined to propose a variety of objects, chosen so as to test the power under different circumstances; and above all, to eliminate accidental influences. The point to be ascertained respecting each individual is the natural representative force of the mind for a given class of impressions, sight in this instance being taken. We wish to compare different minds upon this peculiarity, and under the same circumstances. This is the first and purest form of the inquiry, and supposes the circumstances nearly the same for all. It is a distinct inquiry, serving a different purpose, to ascertain the actually attained visual representative power, under the combined operation of natural power and favourable or unfavourable conditions. Now, while I would include such an object as the breakfast table, I would conjoin other objects that tested the power in different ways. I would ask for the impressions of some entirely new scenes, places, or groupings of objects, as in some recent visit to a place of interest. In this instance, there would be the peculiar advantage of recency; and, as a check, I would ask for the impressions of some place visited years before, in the same passing way. Such cases would be a severe test of the visual persistency as regards large and comprehensive pictures. For a test of detail, I would come home again to more familiar experiences, as the interior of known buildings, where there is a mixture of the fixed and the variable, for example, an assemblage at church, or the theatre, or a ball-room. This would be far more searching and more satisfactory than the breakfast table.

These four requirements would prove the representative power in very testing situations, but would not be exhaustive. The starry sky is an exceedingly good example. So is a large animal, as the elephant. Even the points of a horse would be testing, with individuals equally interested, or equally wanting in interest. The succession of shops in a street, not too familiar, and not too strange, is very testing to the visual memory. Indeed, it must be evident, as we reflect upon the problem in hand, that a promiscuous *viva voce* examination would be the really effectual proceeding. When we do proceed by written questions, the instances given should be varied and representative; while, at the same time, the answerers should be invited to exemplify their powers by self-chosen instances such as to bring out both their strength and their weakness.

I come now to the qualities of the image as set forth in Mr. Galton's queries. The first is *Illumination*. "Is the image dim or fairly clear? Is its lightness comparable to that of the actual scene?" The second is *Definition*. "Are all the objects pretty well defined at the same time, or is the place of sharpest definition at any one moment more contracted than it is in the real scene?" The third is *Colouring*. "Are the colours distinct and natural?"

It appears to me that the Illumination and the Colouring should be

taken together ; both are included in the one circumstance of vividness or intensity. The same mental tenacity that sustains the brightness of the image ought, I think, to sustain the fulness and distinctness of the colouring ; the only exception being in partial colour-blindness, a point that, in an investigation of this sort, should be brought out by a separate query. At all events, the two facts of brightness and colour should not be parted by the heterogeneous and distinct property of Definition.

As regards Definition, too little is asked ; it is well to know whether the place of sharpest definition is in a contracted point, or whether the whole scene is well defined at the same moment ; but this can hardly be deemed the main question. As, in regard to Illumination, a comparison is made with the actual scene, much more should such a comparison be made with Definition or detail. The extent and the truthfulness of the minute details make the real value of the image ; and, unless I am greatly mistaken, carry the other properties along with them. The circumstances where the one class is high and the other low would be worthy of a special investigation. Besides, the comparison of the details of the image with the details of the original would not be so liable to illusion, uncertainty or mistake, as the comparison of the degrees of illumination.

Inasmuch as nothing is more certain in Intellectual Psychology than that the quality of an image is dependent on the quality of the original sensation, some preliminary questions on this last point should have been propounded. As the subject chosen is sight, the character of each individual's natural sensibility to colour and to form might have been ascertained, at least in an approximate way, from each one's own delineation. Only a testing cross-examination, with experimental trials, could give the matter with fulness and precision ; but it would be of use to compare the language of each as to their sensations with the language used for the images. They could have been asked—Have you any special fondness for, or enjoyment of, colours ; and if so, how does this manifest itself ? Comparing yourself with others, are you above or below the generality in this particular ? Then again—Have you a delicate discrimination of shades of colour, as compared with persons you know ? To these questions could be appended a request to be assured of the presence or absence of any degree of colour-blindness or obtuseness, passing beyond mere inferiority in delicacy of discrimination.

Some one ought to devise an easily-worked apparatus for testing shades of colour discrimination. A spectrum very finely graded might serve the purpose ; the test being the number of distinct shades that each person could count. Detached colour specimens could be taken as a check ; the subject of the experiment being asked to sort and arrange them by agreements and differences. As a point of intellectual character this is fundamental. A similar test could be applied to the retinal sensibility for pure form : the two together make the sensory basis of visual imagery, to which basis the mental representations must inevitably conform. To determine by careful observations

the amount and conditions of such conformity, is one great psychological problem. There is even now a producable body of evidence to prove that, as is the sense-discrimination, so is the goodness of the imagery, other things being the same. The concurrence of the musical memory with the musical ear is the best marked example. And although, as in the case of sight, we have not a sifted mass of observations, such as industrious inquirers like Mr. Galton may one day provide, there is also a most apparent concurrence in individuals between colour-discrimination and colour-memory, very notable in the two extremes. There is, moreover, to my mind a strong presumption from the physical side. Great minuteness of discrimination obviously require nervous elements in proportionate number, and this must also be a condition of the support of the mental image.

Notwithstanding the limited scope of the questions, the answers obtained by Mr. Galton are curious and suggestive, and might be followed up in certain cases with great profit. A few remarks occur to me in connexion with some of them.

In the instances where the visualising power is at its highest, there seems to be not the slightest hesitation in declaring the image to be equal to the original in brightness and in colouring, and, by implication although not often stated, in definition and detail. I cannot help regarding this as somewhat strong. The cases where any mental image, or any ideas of any of the senses, can be put on an equal footing with full reality, must surely be rare and exceptional. If I remember right, George Henry Lewes said of Dickens, speaking on Dickens's own authority, that his mental representation of a scene was perfectly equal to the actual impression. In his case, the allegation may perhaps be allowed; his powers of ideal delineation seemed to require extraordinary vividness and fulness of conception; yet less than the actuality might have sufficed. The abnormal conditions of dreaming, delirium, or other unnatural congestion of the nervous system, are able to give representations that attain to life-like vividness. Also, very strong emotion will contribute to bring a picture up to the reality; and in the high poetic examples, as in Dickens, an emotional tinge would always be present; we know that the delineations executed from such imagery are usually idealised. But it would take a good deal to convince me that five per cent of persons taken at random would be entitled to pronounce their ordinary mental representations of visible objects and scenes equal in all respects to the reality as seen by the eyes. The question put is a very trying one to answer, excepting only in the point of definition, which is not pressed home. To frame to one's self a scale of brightness and colouring, and to fix the place of one's own imagery in that scale is far from an easy task. The power of visible representation may deserve to be called remarkable, or even extraordinary, without being exalted to the pitch of full reality. The terms used in the answers to Mr. Galton's queries justify the distinctions that he draws between a very high, a middling, and a low degree of the visualising power;

and might even establish a greater number of well-marked gradations, perhaps five or six ; but the phraseology used for the highest degrees must not be too literally insisted on. It would be interesting, nay indispensable, to have a full examination of some of those persons, to test them in every possible way ; by which means, I have no doubt, their language would be rendered more exact, while the collaterals and consequences of such a power would be highly illustrative of the psychology of the concepitive faculty as well as of the constructive imagination.

Mr. Galton is naturally startled at finding eminent scientific men, by their own account, so very low in the visualising power. His explanation, I have no doubt, hits the mark ; the deficiency is due to the natural antagonism of pictorial aptitude and abstract thought. There is a farther circumstance alluded to by Mr. Galton, in which I believe he is also correct, namely, the tendency to subordinate the visualising power to the special ends of the individual ; to drop from the fulness of the imagery all unnecessary parts, and keep a hold of those that enter into our required trains. In order to use with effect the phrase "a free breakfast table," we do not need to conjure up a full and well-lighted picture of a breakfast table, in the way that Mr. Galton expected ; the conception need not be pictorial at all, and it need not be exhaustive ; only those articles have to be remembered that are for the time subject to fiscal imposts. Mr. Galton seems to think that in the scientific and practical employment of the imagery of the outer world, the concrete visual conception is exchanged for one connected with the motor sense ; but here I think he misses the point. The picture is in every way reduced and shorn of its beams, but what remains is still held by our visible sensibility, in which the strongest holding ground is the retinal adhesion for form. The motor sensibility of the eyes assists, but is far inferior, alike in discrimination and in tenacity, to the retinal sensibility. Colour also aids ; still, the visualising of colour is undoubtedly liable to be dropped except where it serves to make an essential distinction, or where it is naturally strong.

The case with scientific men, and with most kinds of professional workers, is plain enough. But what shall we say to Mr. Galton's including painters of the rank of Royal Academicians among those at the bottom of the scale in visualising power ? This case wants much more probing. No man, I suspect, can be an artist without having the colour-sense good, from which goodness would flow the colour-memory and the colour-imagination. True, there are other merits in a painting besides colour, and a work of art may possess charms distinct from high execution in the colouring part. This is the point that should be pressed in a farther cross-examination of Mr. Galton's Academicians. Possibly, the principle of economising intellectual labour, under which the scientific man ceases to shape the imagery of the world in its concrete richness, may operate with the artist ; but it would not in his case make the same havoc. What we should specially wish to ask these dim-visioned artists is, whether they are

aware of having ever possessed the easy visualising faculty, although they may have it no longer.

A confirmation of the fact that the faculty dwindle by disuse, and by limitation of interest, is given in Mr. Galton's comparison of his hundred adults with Charter-house boys. He finds among these last, and among young subjects generally, a greater vividness of colour-conception, than is maintained in advanced life. This is no contradiction to another fact, namely, that the power of the imagination is susceptible of indefinite increase. All that is implied is that the raw materials of conception—the crude pictures of actually occurring things, which are but partially available, whether for the man of science or the artist—are less vividly retained in later years. They are exchanged for an order of conceptions, which may also be highly concrete, but are wanting in matter-of-fact literality and the superfluous brilliancy of actual scenes. An eminent engineer, quoted by Mr. Galton, had highly developed power of recalling form, but described himself as deficient in the recall of colour. Being awakened to the point, he practised himself in visualising colours, and soon succeeded, thereby reclaiming a source of pleasure. Farther inquiry should be made in his case as to his early experience, before professional routine had blunted the edge of his conceiving faculty.

I had occasion to remark on the desirableness of more minute information respecting the individuals at the top of the scale of visualising power. Equally desirable would it be to push the investigations a little farther in regard to the instances at the bottom. At the lower end of the Charter-house gradation, the power of visualising is given as "nil". One can hardly be expected to rest content with an answer like this. The scene of a cricket match, or of a ball, ought to be recalled to the minds of those benighted boys, whose imagery is darkness visible, and the nature of their recollection of such scenes minutely probed. What ideas do they possess of anything? Do they find any available substitutes for the visualising power? How do they get through life at all? Are they able to enter into the same professions as those at the top or at the middle of the scale? For if they do, the mere pictorial power cannot be so very essential. At what points may it be supposed that the deficiency operates?

This is only putting in another form what has already been remarked as to the incompleteness of Mr. Galton's queries. It is very unsatisfactory to receive an answer on *one* faculty alone, especially if that is above or below average. Even for the sake of knowing all about a single power, we should know something of the other powers of the individual. The ear plays a part in our intellectual being second only to sight; the power of language is the rival power to visual conception, and, in the texture of the memory, may take its place. Something, therefore, should be known respecting the linguistic memory also, without which no statement of the intellectual peculiarity of the individual is complete.

One of Mr. Galton's inquiries related to the extent of mental view.

This is very various, as we may suppose, but I can hardly regard the difference as other than one of degree. It is part of the goodness of the conceiving power to realise at one instant a wide scene. Some of the answers to the main question as to vividness of imagery show a power of conceiving the portions of the scene specifically attended to, and no more. This I take to be simply an inferior degree of conceiving power. It is, to be sure, as good as the actual vision in this respect, that our actual perception of an object is distinct only at the point where the axis of vision falls; we collect the entire picture by shifting the glance over the parts successively. When we have impressed the whole on the memory in this way, our mental image is fuller and better than actual vision at any one moment; the picture is a compiled or aggregated picture, the result of many acts of sensible attention. The idea in this way far transcends the sensation; the mental glance at the starry vault might be equally full and distinct throughout; the actual glance is full at a central point, and is progressively vague away from that point.

It is, therefore, not a matter of surprise that some of Mr. Galton's witnesses should testify to the possession of a field of mental view larger than the reality. They can see all round a room, or take in at one glance the six faces of a die or the entire surface of a sphere. This is, in principle, nothing more than conceiving with equal distinctness all the parts of what the eye *learns* to compass at one glance. In both cases, there is an aggregation of successive acts of inspection; the picture is not a single glance possessing the vividness of the actual, it is a composition of many glances successively impressed. Hence we may find it just as easy to extend the sphere of mental view, as it is to fill it up with equal vividness.

Mr. Galton makes a separate point of the power of projecting an image. A blank piece of paper is placed in our hand, and we are asked to superimpose images upon our mental picture of the blank. I am disposed to believe that this power follows the visualising faculty in strict concomitance. It typifies the first stage of conception proper, the stage in advance of memory, and short of imagination. It is needed whenever we have to realise a description, and is anything but a strange or novel test of ability. Hobbes's mountain of gold is a degree beyond the placing of an object on a white paper. The best exercises for either testing or improving this higher stage of the conceiving power are still a matter for consideration.

In his comprehensive article in the *Fortnightly*, Mr. Galton suggests that the visualising faculty, as he depicts it, should be systematically educated. This, I think, is premature, even on his own showing. The fact that it is allowed to fall into disuse, proves that it is not needed for the ordinary purposes of life. Even at best, the literal imagery seems only to feed a more eclectic imagery suited to our real wants. A much deeper inquiry than has yet been made would be requisite in order to decide what additional special training should be imparted to the aptitude for retaining visual imagery in something of its realistic brightness and fulness. We ought never to think of

trying to picture objects indiscriminately; and the question would arise which objects and scenes should we select—a question inevitably modified by our future needs. There is a culture that is desirable in itself for people generally, namely, the power of conceiving with some degree of vivacity and completeness the descriptions given in geography, topography, travels, narratives, and picturesque poetry. Our unavoidable contact with the world, and the imagery incidentally acquired in the course of our education, enter into this equipment; and we may add, of ourselves, the express exercise of conceiving the scenes brought before us in verbal delineation. Such an exercise would properly belong to our voluntary or self-imposed education, and would be misplaced in any school curriculum.

A. BAIN.

PERFECTION AS AN ETHICAL END.

Mr. Thorneley's article (in MIND XIX.) on this subject is interesting alike from its novelty, and from the ability with which he pleads his case; but it appears to me that his theory is vitiated by a fundamental fallacy. Assuming the existence in human nature of "a moral impulse or desire of right" as the ultimate fact on which the science of Ethics depends, he remarks that, while its origin has been accounted for in a variety of ways, moralists of all schools unite in regarding this "moral motive or desire as a *means* only to something other than itself": . . . "a motive . . . which will have fulfilled its purpose and ceased to exist whenever a certain definite state of things shall have been reached, whether this state of things be taken to be universal happiness, or conformity to certain absolute rules, or the establishment of a certain inward balance of motives." Mr. Thorneley thinks that this is reversing the right order of things, and that the truer view is "to take the desire of right or love of duty as the *end*, towards which all other motives, together with all acts bodily or mental, all institutions, and, finally, all life itself are to stand in the position of *means*. The desire of right he regards as "the only thing having absolute value in the universe". And his ideal of perfection is "a state of things where it shall have vanquished and destroyed every meaner impulse of man's nature, and constituted itself the sole impelling force to which he yields obedience".

Now, we must first note that the end is not to be perfection, but the *desire* of perfection; not right, but the *desire* of right; and the objection instantly occurs that if this be so, the moment a state of perfection is actually reached, we shall have attained the somewhat paradoxical position of an end beyond the ultimate end; an end beyond that end which Mr. Thorneley has already declared to be "the only thing having absolute value in the universe". This difficulty is recognised by Mr. Thorneley himself in the final paragraph of his article, where he says: "To what purpose our moral energies are destined to be put if they shall ever have completed their present

task and vanquished and subdued all inferior motives, we cannot even pretend to guess; but if we believe that there is a real positive purpose underlying the work of the Deity in the universe, . . . it is only natural to hope that when we have brought our powers into harmony with His will, we shall be allowed to employ them in furtherance of His work". This solution of the difficulty is somewhat vague, but, though I agree with Mr. Thornely that it is scarcely a subject for speculation, I venture to think that he hardly sees the full force of the difficulty itself.

In a state of perfection, Ethics or the study of moral principles must gradually become obsolete, or at least retain only an archaeological interest, and I understand Mr. Thornely to agree that such will be the case. But if the desire of right is to die also, I confess I do not see how the practice of morality or rather of right is to survive either. To make this clearer, let us examine the functions and meaning of morality a little more closely. Morality of course can only find place in an environment of more or less imperfection, for it implies the possible alternative of immorality. It postulates a recognition of the distinction between right and wrong, but it also involves the possibility of a preference for one or the other. Virtue consists in eschewing evil and pursuing good ; but where there is no evil to eschew, there can be no virtue or virtuous action. It is meaningless, for instance, to speak of God as being virtuous. The distinction of right and wrong may well exist in the minds of men, unaffected by the degree of perfection to which they have attained ; for even in a state of perfection it would be possible to conceive a state of things diametrically opposite ; and this latter would be called evil or wrong, in contradistinction to the existing state of perfection which would be regarded as good or right. But in this state of perfection—I mean of course, as I presume Mr. Thornely does also, a perfection relative to our physical environment—there can be no morality, for there can be no desire to do wrong.

And this brings me to what I conceive is the confusion that has misled Mr. Thornely. It will be observed that he uses "desire of right" and "love of duty" as synonymous terms. Now it appears to me that they are by no means synonymous.

The desire of right is not incompatible with a state of perfection ; the love of duty, as I understand duty, is incompatible with such a state, because in it the conception of duty as such must disappear. If mankind had never had any desire save for that which was right, the conception of duty could never have arisen ; for an essential prerequisite of this conception is a conflict of desires. It is the desire of right which causes us to love duty, that is to say, to love that course of action which fulfils our desire of right in spite of conflicting desires. But when all conflicting desires have been destroyed, the love of duty—Mr. Thornely's *end*—will perish from inanition. The desire of right will survive, and will survive with the enhanced vigour derived from the other impulses of man's nature which it has, not destroyed, but rather absorbed, as Mr. Thornely brilliantly and suggestively puts

it, by a process "answering to what is known in the physical world as the transmutation or conversion of energy".

And here I am at one with him ; but it seems to me that this view of perfection differs verbally only from that which holds that, "Perfection will be reached when the appetites, affections, and desires shall have been brought to a certain desired degree of strength"; or as Tennyson has it, when

"the full grown will
Circled through all experiences, pure law,
Commeasure perfect freedom".

To return for a moment to a criticism that I have already suggested. Surely it is only in a strained and unnatural sense that we can speak of the desire of a thing as an end ulterior to the thing desired. The thing we desire must be something which is at any rate regarded as more valuable than the desire itself. Were this not so, it is not easy to see why we should ever put an end to our desire by gratifying it. Apply this to Ethics, and we obtain as the result an ethical system whose end is not *πρακτικόν τι*—an active virtuous state—but an empty desire for such.

Briefly to recapitulate. It seems to me that the end must be right, not the desire of right. That even in a state of perfection the desire of right, of the *καλὸν κἀγαθὸν*, will survive as a *βούλευτικὴ ὄρεξις*, and will be perpetually fulfilled by a life of absolute rectitude. The love of duty will disappear, because all distinctive conception of duty as such must disappear also, by an absorption, so to speak, into that supreme desire of rectitude which will be at once our only wish and our only welfare.

NORMAN PEARSON.

BRUTE REASON (II).¹

Perhaps the shortest as well as the completest refutation of the "inductive" argument for brute reason would be found in the simple statement of the postulate upon which it proceeds, and apart from which it is wholly without meaning, namely, that *the exhibition of discrimination, design, and adaptation in actions indicates reason in the agents*—an assumption never expressed, yet always, and necessarily implied; but which not only begs the whole question at issue, but goes far beyond it, involving the rationality even of plants and inanimate matter, as well as of animals in respect of actions generally admitted to be "purely instinctive".

It may be well, too, to observe here, that, viewed thus in its completeness, this argument, though commonly called inductive, is really the enthymematical form of the deductive process, of which this postulate is here the suppressed major premiss, the "facts before us" serving as so many minor premisses, which, with the conclusion, form as many separate deductions.

¹ Concluded from MIND XIX., p. 409.

We now resume the examination of this subject where we left off in a former paper. We have seen that reason and instinct cannot co-exist in the same individual; that rationality in an animal would involve the destruction of those very powers which commonly distinguish animals from men. A bee either knows or it does not know the geometric value and significance of hexagons and rhomboids. It cannot both know and be ignorant of them at the same time. Neither can it be supposed to "know and intend" in unusual circumstances an alteration, upon mathematical principles, of a work the very existence of which it was ignorant of till a moment before, when originally constructing it, upon the same principles, in "ordinary and natural circumstances". We have, therefore, arrived at this position, namely, that *animals are either instinctive or rational; they cannot be both.* Hence it finally remains to be considered which of these two alternatives is the more probable.

This, however, may seem a superfluous task to all but those upon whose minds the notion of brute reason has taken so fast a hold as to assume the appearance of an "evident" truth; or in whose philosophical systems its assumption constitutes an essential factor. Once admit the incompatibility of reason with instinct in the same individual, and the consequences scarcely allow of discussion. If it be true that animals are *either* instinctive *or* rational, the testimony of the "facts before us" is no longer equivocal. Then, indeed, the inductive method may be effectively applied; but whether inductive or deductive, the argument is equally brief and decisive. To those, therefore, in whose judgment the conduct of animals still carries with it its own evidence of rationality the following considerations are commended.

1. It is in the nature of things impossible logically and philosophically to show that animals do reason. This will scarcely be disputed if the two following facts are recognised.

(a.) That, language apart, neither the operations of animals, however skilful, nor even the handiworks of men, however artistic, afford of themselves any evidence of the rationality of the workers. If a being, say, from another planet, could visit our world, with no previous knowledge of men or of animals, their works or their habits, and with no capacity for acquiring human language, yet possessed of intelligence and faculties adapted for closely and accurately observing the works and conduct both of men and of animals, and marking from a rational point of view the sagacity and skill observable in their purposes and relations, their adaptations and achievements, it can hardly be doubted that such being would, on reflection, ascribe a large proportion of the "purely instinctive" conduct of animals with some of the highest of human achievements to mental powers similarly constituted operating under the same laws, notwithstanding the strange diversity of physical conditions under which the workers exist. The structure and furnishing of a beehive, of various ant hills and nests, of a palace or mansion, and of an ordinary street or town, together with the daily activities of their inhabitants, would present to him the same general features of discrimination, design, and adap-

tation, differing, if at all, in scarcely appreciable degrees, as between the man and the animal. Of two specimens of paper placed before him, the one from the hand of man, the other from the mandibles of the wasp, it would be impossible for him to say which was the product of reason and which of instinct. So of the conduct of the solitary wasp in providing for the sustentation of its posthumous young, and the measures adopted amongst men for the support and wellbeing of a coming generation. Clearly, then, mere works, even though works of art, or schemes of forethought and providence, of themselves afford no evidence of reasoning in the workers.

(b.) That the only reliable test of rationality objectively available to us is *discourse*. While of our own rationality we have the conclusive evidence of consciousness, our intercourse with our fellowmen furnishes us with the only, though scarcely less conclusive, evidence of their rationality. We can lead them simultaneously into a course of ratiocination and the exhibition of the details of that course by dint of language oral or written. But by no such tests can we place ourselves in a position to affirm that brutes reason. We can hold no rational intercourse with them, since they neither have nor can be taught any language as a common medium of intercourse between them and ourselves. The deaf and blind and dumb of the human race can be taught a language, and the extent of their reasoning power is then mainly a question of culture and endurance.¹ But animals which are neither blind, nor deaf, nor *dumb*, but which can be made to utter words in any language with considerable distinctness and accuracy, and even to articulate appropriately whole sentences in response to given words or signs, cannot be taught to utilise their powers of speech for any even of the simplest or most serious purposes of life, though reared and kept in families many years where one language, and but one, is constantly spoken. Teach an animal to speak as you may, you cannot throughout its whole life of, say, twenty to fifty years, effect in it that rational development, as evinced in the practical utilising of the power of speech, which a child untaught exhibits in three or four years. Test the supposed reasoning powers of a dog by the simplest and most effective means. Hold a bone before him, and tell him in language he is daily accustomed to hear that it is poisoned and will kill him if he take it; promise him some better and wholesome food instead; and what is the result? Your

¹ Laura Bridgman, totally blind and deaf and dumb from early infancy, and with scarcely any sense of taste or smell, writes, in her twentieth year, to her brother, in the course of a long letter—"I study Algebra, Geometry, Physiology, N. Philosophy, History. Last month I implored Wight to please to teach me Algebra and Geometry. She said that it was very difficult for me to study them. G. seems very difficult for me to comprehend it perfectly. . . . When I first studied G., Wight was very kind and patient to explain to me the meaning of all those things so repeatedly for a week. I thought it was impossible to understand G., but I rejoice very much to be able to puzzle [it] out at last."—*Life and Education of Laura D. Bridgman*, by Mary Swift Lamson.

words have not the least attention ; the bone absorbs it all, and if you let him he will take it notwithstanding your warning. Teach a parrot to utter a number of words, explain them each to it, and then arrange them into a plain and simple sentence to the effect that you will kill it unless it perform some special course of action to which it is unaccustomed, though easily capable of performing it ; throw into your manner the utmost apparent seriousness ; still your threat will occasion not the least perturbation, and if it answer you at all it will do so in one or more of its stock phrases, however ludicrously irrelevant. Yet here you have, in language with which they have ever been daily and hourly familiar, threatened their lives, which animals are ever prompt to defend with the utmost energy in circumstances of danger.

Moreover, it is highly significant in its bearing upon this question, that while it seems to be an inherent property of the human mind to seek the best available means of receiving and communicating its ideas, animals which can speak practically as well as man never use their powers of speech for the purposes of *mutual* intercourse. Still more significant is this in view of the further fact that language, though absolutely essential to the development and practical utility of the rational powers, is in every case artificial—the creature of that reason to the development of which it is so essential. And here we seem to have a complete answer to any argument for brute reason founded on the supposed possession of "natural language" by certain animals, as the ant and the bee. Whatever be their means of inciting each other to co-operate to a common end, it is clear that it differs essentially from human language. They neither construct it nor acquire it as man does his language, but possess it at their birth. They receive it as they receive their senses ; and for aught we can perceive it operates much as the appetites and passions operate both amongst animals and mankind. Its possession, therefore, no more implies rationality than the possession of sight, hearing, feeling, or the sexual and social affinities.

Now the human mind cannot remain content to express itself in mere ambiguous gesticulation while a better medium is open to it. It requires definite and intelligible signs ; and of these it employs the most expressive within its command. No human being, for example, normally possessed of the gift of speech would prefer to use manual signs. But those signs, whatever they be, can only become available through express mutual agreement between the communicating parties both as to the signs themselves and their significations and powers. Thus a child learns to converse with its parents, and succeeds only as it comprehends and adopts their symbols, with their separate and combined significations. Those symbols are words uttered by the mouth, the most convenient and perfect mode of intelligent communication. And this the child learns of itself. It does not need to be taught. Its language, though wholly artificial, grows with the growth of its intelligence—*language*, not mere words, disconnected, incongruous, meaningless ; but arranged in increasingly multifarious dispositions.

tions and applications, the various significations and powers of each separate word, with their indefinite number of modifications in the increasingly numerous and varied combinations of those words, as required to express the ever-growing number, variety, and complexity of the child's ideas. And this is true of all children reared where any language is spoken, unless afflicted with deafness, or with malformation, or disease of the brain, or of the vocal organs; but it is not true of any animal, even of those which have the gift of speech and can utter and connect words the pronunciation of which by a human being involves very complex action of the vocal organs. Language, then, being the sole medium of intelligent intercourse amongst mankind, it is manifest that the want of it amongst animals must form an insuperable bar to any positive evidence of reasoning power in them, while their incapacity for constructing or acquiring any language, even though possessing the gift of speech, affords very strong presumptive evidence against their having such reasoning power.

2. If animals do reason they must have reasoning faculties or powers *which either are similar in their nature and operations to those of men or they are not.* If they are, they must, like his, be capable of indefinite culture and development. Not only are animals then rational in the strictest sense of the term, but they are co-equal with man in their moral and intellectual nature and capabilities, and have an ultimate destiny scarcely, if at all, inferior to his; and this altogether apart from any question or fact as to the evolution of man from the lower animals. If their reasoning powers be essentially different from man's, in what does the difference consist? Man observes, searches after, or assumes facts, and deduces consequences therefrom, which, in turn, become the facts or premisses from which he deduces further consequences, and so on *ad infinitum.* Every conclusion thus drawn furnishes an addition to his previous stock of knowledge, the intrinsic truth or falsity of which he further tests by comparing them with other related truths which are either self-evident or have been already established beyond question. If such conclusions, following logically from the premisses, accord with those truths, they are accepted as true; if not, both they and their premisses are rejected as false, the knowledge which they seem to furnish being deemed to be error instead of truth. This is man's mode of reasoning; it embraces both the inductive and the deductive methods, and is his only means of acquiring objective knowledge not derivable directly through the senses. Nor is any other conceivable. If, then, the process of brute reasoning be different from ours, the difference should be in the limitations merely, and not in the nature of the process. And this is, indeed, the only distinction commonly held to subsist between the reasoning power of animals and that of man. Animals, we are often told, reason from fewer ideas than men. Yet ideas compared necessarily suggest new ideas; these compared suggest others, and so on. This *is* the reasoning process; and the possible extent of its range is obviously a mere question of actual culture.

But the same faculties or powers are required for the few ideas as for the many so far as regards any logical use of them. If, then, those powers in animals be the same as in man in their nature and *modus operandi*, they must also be capable generally of the same culture and development; in which case, not only is the actual intellectual and moral equality of animals with man a mere question of time, but their progress in that direction should have presented unmistakable indications during the past history of the species.

Yet no truth stands out more prominently in natural history, than that of the stationary character of the operations of every species of animal. The bee builds the same cell, the wasp manufactures the same paper, the spider weaves the same web, as in the earliest periods of their recorded history. There is neither advance nor retrogression in their works, as in the works of man, to show either increase or decrease of intellectual power. True, certain modifications of the habits and works of individual animals occur, as those animals' circumstances and conditions of life are varied; but these, with the same species are ever the same in like circumstances, and can only be classed with the conduct of Huber's bees in turning the comb to avoid the glass. Restore the animals to their former condition, and they revert to their former habits, and resume their former works, as if they had never been interrupted.

3. Lastly, there is the important fact that, in many instances in the conduct of animals in which, to mere observation, appearances seem most to favour the reason-hypothesis, *it is in the nature of things impossible that such conduct should result from reasoning on the part of the animals.* This fact alone should go far to close the entire controversy; since, if we are forbidden by the nature of things to attribute to reason actions exhibiting in the highest degrees the semblance of astute sagacity of discrimination, design, and adaptation, with the employment of highly complex, yet most effective, means to ends, surely it were a poor philosophy indeed that should seek by the aid of the reason-hypothesis to account for actions exhibiting those self-same qualities in lower degrees, merely because the same intrinsic objections to that hypothesis were in their case superficially less manifest. If the higher classes of actions be, from the very fact of their lofty elaborate, discriminating, far-seeing, far-reaching character, inexplicable upon the reason-hypothesis, and inconsistent with it, upon what principle either of philosophy or of common sense can we attribute the lower classes to reason? Now, it is very significant that of all the innumerable stories which believers in brute reason are never tired of citing as instances of brute reasoning, those to which they attach the most importance are invariably those which on the reason-hypothesis leave the most to be explained. They are such as in the nature of things could not have been performed rationally, notwithstanding the motives, aims, and reasons so freely attributed by the narrators to the animals in question. Take the two following instances of home-finding. Dr. Hancock tells of a dog which, having been taken from London to Scotland by sea, found its way home

again by land;¹ Mr. Spence, of an ass which, shipped on board a British frigate at Gibraltar for Malta, was thrown overboard in a storm off Point de Gat, swam safe to shore, and made its way back to Gibraltar, "a distance of more than 200 miles, through a mountainous and intricate country intersected by streams, which he had never traversed before, and in so short a period that he could not have made one false turn".² Now, both these animals, being domestic and not migratory, were here placed in circumstances in which—according to the current theory of instinct, i.e., the theory which by the limitations it attaches to the scope of instinctive operation makes reason its essential complement—instinct should have proved to be entirely at fault, leaving the animals wholly dependent for direction upon such resources as their reason might be able to furnish. Yet by no possibility could these animals in such circumstances have reasoned their way home. The circumstances were neither "ordinary" nor "natural" to the animals, yet they made their way homeward with undeviating accuracy "without instruction or experience". A man in such a case, if sufficiently educated, might possibly have guided himself—though not with the precision of the ass—by observing the positions of the heavenly bodies, if these were visible, or the indications of finger-posts, if there were any; or, at the worst, he could have inquired his way. But the use of any of these means would have necessitated a very careful, constant, and judicious exercise of the reasoning faculties. These animals had no such resources. They knew nothing of the roads, nothing of stars or of finger-posts, and they had no power of speech. They were destitute, not only of the knowledge necessary for rational guidance, but of all means of acquiring it. The essential conditions and appliances for reasoning were absolutely wanting.

And so, if we carefully apply the like simple tests to any of the marvellous stories told about brute reasoning, the results will unquestionably prove the same in each case. The material and appliances for reasoning at the animal's command will be found wholly inadequate to the achievements performed. This, however, is what believers in brute reason invariably fail to perceive. They beguile themselves by viewing the conduct of the animals in the light of their foregone conclusions, and from a human and even a cultured standpoint. They forget how much they themselves owe to education, not merely that of their childhood and schooldays, though that were incalculable, but incomparably more to that arising from their constant intercourse with rational and even cultured fellow-beings—an education incessantly, though imperceptibly enlarged and varied and developed by the ever changing minutiae of life's experience, familiarising them with innumerable facts and truths and principles to which even the most favoured of animals must, from the narrowness and fixedness of the routine of their daily existence, necessarily remain wholly unacces-

¹ *Instinct and its Moral and Physical Relations*, by Thomas Hancock, M.D., p. 72.

² Note to "Instincts of Insects" in *Entomology*, by Kirby and Spence.

sible, but without the knowledge of which facts and truths and principles reasoning such as they are credited with is absolutely impossible.

JOHN LE MARCHANT BISHOP.

THE FEELING OF EFFORT.

Dr. William James, Assistant Professor of Physiology in Harvard University, has recently contributed to the Anniversary Memoirs of the Boston Society of Natural History, 1880, a dissertation, bearing the above title, from which we extract in the meantime the following summary of "Conclusions" :—

"(1). Muscular effort, properly so called, and mental effort, properly so called, must be distinguished. What is commonly known as 'muscular exertion,' is a compound of the two.

(2). The only feelings and ideas connected with muscular motion are feelings and ideas of it *as effected*. Muscular effort proper is a sum of feelings in afferent nerve tracts, resulting from motion being *effected*.

(3). The pretended feeling of efferent innervation does not exist—the evidence for it drawn from paralysis of single eye muscles vanishing when we take the position of the sound eye into account.

(4). The philosophers who have located the human sense of force and spontaneity in the *nexus* between the volition and the muscular contraction, making it thus join the inner and the outer worlds, have gone astray.

(5). The point of application of the volitional effort always lies within the inner world, being an idea or representation of afferent sensations of some sort. From its intrinsic nature or from the presence of other ideas, this representation may spontaneously tend to lapse from vivid and stable consciousness. Mental effort may then accompany its maintenance. That (being once maintained) it should, by the connexion between its cerebral seat and other bodily parts, give rise to movements in the so-called voluntary muscles, or in glands, vessels, and viscera, is a subsidiary and secondary matter, with which the psychic effort has nothing immediately to do.

(6). Attention, belief, affirmation, and motor volition, are thus four names for an identical process, incidental to the conflict of ideas alone, the survival of one in spite of the opposition of others.

(7). The surviving idea is invested with a sense of reality which cannot at present be further analysed.

(8). The question whether, when its survival involves the feeling of effort, this feeling is determined in advance or absolutely ambiguous and matter of chance as far as all the other data are concerned, is the real question of the freedom of the will, and explains the strange intimacy of the feeling of effort to our personality.

(9). To single out the sense of muscular resistance as the 'force sense,' which alone can make us acquainted with the reality of an outward world, is an error. We cognise outer reality by every sense. The muscular makes us aware of its hardness and pressure, just as other afferent senses make us aware of its other qualities. If they are too anthropomorphic to be true, so is it also.

(10). The ideational nerve tracts alone are the seat of the feeling of mental effort. It involves no discharge downward into tracts connecting them with lower executive centres; though such discharge may follow upon the completion of the nerve processes to which the effort corresponds."

VIII.—NEW BOOKS.

[*These Notes are not meant to exclude, and sometimes are intentionally preliminary to, Critical Notices of the more important works later on.*]

Lectures on the Science and Art of Education, with other Lectures and Essays. By the late JOSEPH PAYNE, the first Professor of the Science and Art of Education in the College of Preceptors, London. Edited by his Son, Joseph Frank Payne, M.D., Fellow of Magdalen College, Oxford. London : Longmans, 1880. Pp. 386.

Dr. J. F. Payne, in collecting these Lectures and Essays, has not only discharged a pious duty to the memory of his honoured father, but done a great service to all who are concerned in the reform of Education. From the year 1830, when at the age of 23 he published the "Compendious Exposition of Jacotot's System of Education" reproduced in the present volume (pp. 335-86), Joseph Payne, by quiet unremitting labour, did as much as any other man in this country to bring on the present educational awakening. For a long time, after the publication of his first Essay, his influence was mainly that of a practical teacher, but, as soon as he was set free from the cares of his profession in the year 1863, he resumed his pen and began a new career of activity, chiefly as a lecturer to the College of Preceptors of which he had been one of the first founders, in 1846. The present volume contains most of the occasional lectures he delivered there or elsewhere up to the time of his death in 1876. It includes also the carefully composed and condensed statement of his fundamental notions, "Principles of the Science of Education" (pp. 97-100), put into the hands of his students at the College of Preceptors, where, in the year 1872, he was appointed the first English Professor of the Science and Art of Education. Three of his previously published lectures—on Fröbel, Jacotot, and Pestalozzi—are held over from the present collection to "form, with some unpublished lectures, a volume on the History of Education, which may, it is hoped, if sufficient encouragement is met with, follow this". In the pieces here collected, the author's great plea, that the educator ought to be guided by a conscious reference to underlying principles of physiology, psychology and ethics, is never argued without admirable balance of judgment. The good sense that always goes with his enthusiasm is particularly manifest in the paper entitled "The Curriculum of Modern Education". His fundamental psychological principle, borrowed from Jacotot, that the child is educated strictly and only by what he is led to do for himself, receives everywhere the most effective handling.

Animal Magnetism. Physiological Observations by RUDOLF HEIDENHAIN, M.D., Professor of Physiology in the University of Breslau. Translated from the Fourth German Edition by L. C. Wooldridge, B.Sc., London, with a Preface by G. J. Romanes, F.R.S. London : Kegan Paul, 1880. Pp. xiv. 108.

This is a translation of a lecture delivered in January by Prof. Heidenhain of Breslau on the subject of mesmeric trance, *apropos* of some public demonstrations then being made in that part of Germany by a clever Danish mesmerist named Hansen. The eminent physiologist was moved by the popular excitement over the phenomena to subject them to a strict investigation, and the lecture contains both a record of carefully made experiments (chiefly by Heidenhain himself, upon thoroughly trustworthy subjects) and a physiological interpretation of them. Added to the lecture is an account, filling half the little volume, of further results obtained with the help of Dr. Grützner. The results, for the most part, do not go beyond those obtained long ago by Braid : the interest of the present inquiry lies in its being made by a trained physiologist in the light of the latest knowledge of the nervous system. Heidenhain's interpretation is shortly given in the following extract :—

"In the face of all these facts, it appears to me that the hypothesis that the cause of the phenomena of hypnotism lies in the inhibition of the activity of the ganglion-cells of the cerebral cortex is not a too adventurous one ; the inhibition being brought about by gentle prolonged stimulation of the sensory nerves of the face, or of the auditory or optic nerve."

Mr. Romanes, in his short Introduction to the translation, gives in his adhesion to the view that the physiological fact of Inhibition supplies the true ground of explanation, but he is less satisfied than Heidenhain that we can yet speak of the phenomena as being adequately explained. The translation is well and carefully made, but, in the title, omits the rather important qualification "so-called" prefixed in the original to the words "Animal Magnetism".

Mr. G. Stanley Hall, who has taken part in Heidenhain's experiments, will deal with the whole subject in the next number of MIND.

Lectures on the Origin and Growth of Religion as illustrated by the Religion of Ancient Egypt. Delivered in May and June, 1879. By P. LE PAGE RENOUF. The Hibbert Lectures, 1879. London : Williams & Norgate, 1880. Pp. 259.

The author develops his subject under the following heads, giving one lecture to each : (1) The Sources of Information respecting the ancient Egyptian Religion ; (2) Antiquity and Characteristics of Egyptian Civilisation ; (3) The Gods of Egypt ; (4) Communion with the Unseen World ; (5) The Religious Books of Egypt ; (6) Religious Books and Hymns : Henotheism, Pantheism, and Materialism. The following sentences from his 'Conclusion' give the author's main results :—

"The interest which the history of Egyptian religion inspires must be derived solely from itself, not from any hypothetical connexion with other systems. . . . This religion was not from the first that mere worship of brutes which strangers imagined it in the days of its decline. The worship of the sacred animals was not a principle but a consequence ; it presupposes the rest of the religion as its foundation, and it acquired its full development only in the declining periods of the Egyptian history. It is based

upon symbols derived from the mythology. The mythology has exactly the same origin as the mythology of our own Aryan ancestors. The early language had no words to express abstract conceptions, and the operations of nature were spoken of in terms which would now be thought poetical or at least metaphorical, but were then the simplest expressions of popular intuition. The *nomina* became *numina*. The Egyptian mythology, so far as I can see, dealt only with those phenomena of nature which are conspicuously the result of fixed law, such as the rising and setting of the sun, moon and stars. . . . Besides the powers recognised by the mythology, the Egyptians from the very first spoke of the Power by whom the whole physical and moral government of the universe is directed, upon whom each individual depends, and to whom he is responsible. The moral code which they identified with the law governing the universe was a pure and noble one. . . . The rites are paid to the departed because death is but the beginning of a new life, and that life will never end."

M. Tullii Ciceronis De Natura Deorum Libri Tres. With Introduction and Commentary by JOSEPH B. MAYOR, M.A., Professor of Moral Philosophy at King's College, London, &c. Together with a New Collation of several of the English MSS. by J. H. Swainson, M.A. Vol. I. Cambridge: University Press, 1880. Pp. lxxi, 228.

Prof. Mayor's Introduction to this most carefully wrought edition of the *De Natura Deorum* includes, besides an Analysis and elaborate discussion of the Sources of Book I., an Historical Sketch of Greek Philosophy from Thales to Cicero (pp. ix.-xxxvii.). The design is to exhibit the general relation of the views of earlier philosophers, to which Cicero is continually referring; leaving points of detail to be discussed in the notes on each particular passage. The sketch ends with a more particular statement of Cicero's own relations to the four great Greek schools. Prof. Mayor finds the indecision of Cicero's political views reflected in his philosophy.

"Epicureanism indeed he condemns . . . its want of idealism, its prosaic regard for matter of fact, or rather its exclusive regard for the lower fact to the neglect of the higher, its aversion to public life, above all perhaps its contempt for literature as such, were odious in his eyes. But neither is its rival quite to his taste. While attracted by the lofty tone of its moral and religious teaching, he is repelled by its dogmatism, its extravagance and its technicalities. Of the two remaining schools, the Peripatetic had forgotten the more distinctive portion of the teaching of its founder . . . and it had dwindled accordingly into a colourless doctrine of common sense, of which Cicero speaks with respect indeed, but without enthusiasm. The Academy on the other hand was endeared to him as being lineally descended from Plato, for whose sublime idealism and consummate beauty of style he cherished an admiration little short of idolatry, and also as being the least dogmatic of systems and the most helpful to the orator from the importance it attached to the use of negative dialectics. . . . The conclusion of his argument on the nature of the Gods may be considered to point the way, vaguely indeed and hesitatingly, to the mysticism of later times, when the human mind, wearied out with its fruitless search after truth, abjured reason for faith and surrendered itself blindly either to the traditions of priests or to the inward vision of the Neo-Platonists."

La Science Sociale contemporaine. Par ALFRED FOUILLÉE. Paris: Hachette, 1880. Pp. xiii, 424.

M. Fouillée here continues the application of his philosophical method of "reconciliation," taking for his subject that social science which is the chief problem of the present time and which is more and more seen to involve the solution of all other questions relating to man,—moral, psychological and even biological. The two ideas which he finds here in conflict are those of Social Contract and Social Organism, the former as upheld by the school of Rousseau (mainly French), the latter by the historical and the naturalist schools of this century. It is but another case of the great antithesis of Will and Determinism which M. Fouillée has previously discussed in different aspects, in his *Liberté et Idée moderne du Droit*.

"Here again it does not seem to us impossible to bring together the opposed doctrines of idealism and naturalism, and even to reconcile them entirely in the domain of practice, by showing through what force the *ideal*, present to our thought, may be realised in *nature* itself. Far from seeming to us opposed, the theories of voluntary contract and organic evolution appear to us inseparable: the true human society ought to show them in unity. We shall therefore place ourselves by turns, in this book, at the different points of view of the opposed schools, so as to discover their relative truth and final harmony. We hope thus to obtain, at the end, as a practical result, a more comprehensive notion of social justice and social fraternity."

Histoire de la Philosophie Scolastique. Par B. HAURÉAU. Seconde Partie, Tome Premier. Paris: Pedone-Lauriel, 1880. Pp. 462.

In its new form M. Hauréau's work takes undoubtedly the first place as an accurate and comprehensive history of Scholasticism. The position of the author has afforded him unusual facilities for adding to and improving the brilliant sketch of Scholastic Philosophy which appeared in 1850 (*De la Philosophie Scolastique*, 2 vols.), and his special researches, some of which have already been published in the interesting volume *Singularités Historiques et Littéraires*, 1861, have enabled him to cast fresh light on many obscure epochs of mediæval thought. The present volume, taking up the history from the revival of literary and scientific studies in the 12th century, passes in review the main features of the intellectual life of Europe in the 13th and 14th centuries, gives new and valuable information as to the studies at the University of Paris during that period and as to the eminent but little known writers who prepared the way for the great development of Scholastic Philosophy, and concludes with an elaborate treatment of Albertus Magnus and Thomas Aquinas. Of the new matter contained in the volume perhaps the most interesting portions are those bearing on the history of the study of Aristotle at the Paris University, with respect to which Hauréau's researches have enabled him to clear up a hitherto unexplained fact; on the sources of the numerous heresies of the 13th century; and on the eminent but well-

nigh forgotten Paris doctor, John of Rochelle, of whose psychology a copious and valuable analysis is given. We shall wait with much interest for the appearance of the concluding volume of M. Hauréau's work, which will deal with the perplexed history of the dissolution of scholasticism.

[R. A.]

Handbuch der Physiologie. Herausgegeben von Dr. L. HERMANN, Professor der Physiologie an der Universität Zürich. Dritter Band. 'Physiologie der Sinnesorgane.' Theile I., II. Leipzig: Vogel, 1879-80. Pp. 602, 461.

The two parts of this third volume of the comprehensive treatise on Physiology (in six volumes) edited by Prof. Hermann and written with the co-operation of no less than twenty-two other German physiologists of distinguished academic standing, contain the most elaborate account of the Human Senses, taken together, that has yet appeared. Part I. is wholly devoted to Sight. It consists of four sections: the first two, on Dioptrics and Sensation of Light, by Prof. A. Fick (pp. 3-138, 139-234); the third, on the Chemistry of the Retina, by Prof. W. Kühne (pp. 235-342); the last, on the Space-sense and Movements of the Eye, by Prof. E. Hering (pp. 343-601). Part II. begins with Hearing by Prof. V. Hensen (pp. 3-142); then follow, in succession, Taste and Smell by Prof. M. v. Vintschgau (pp. 145-286), Touch and Common Sensation by Prof. O. Funke (pp. 289-414, the last two or three pages compiled from Funke's notes, on his death last year, by Prof. J. Latschenberger), Sense of Temperature by E. Hering (pp. 415-39), with a short Appendix on Irradiation to Hering's other article (pp. 440-8), and a General Index. It will be impossible, at any time, to criticise so many articles, or rather treatises, in detail, but references to them will henceforth always be necessary when the subjects come up for treatment in this journal. In the way of general remark, it may be said that there is a want of proportion among the constituent elements of the account of Sight, especially in Kühne's overgrown article; while Hering, in dealing with his part of the subject, has far too much, for a work of this kind, indulged in the expression of personal views. Funke's article on Touch &c. is a very careful and honest piece of work. Before long there may be an opportunity, in these pages, of dealing more particularly with some of his positions.

Geschichte der neuern Philosophie. Von KUNO FISCHER. Erster Band. Zweiter Theil: 'Fortbildung der Lehre Descartes; Spinoza'. Dritte neu bearbeitete Auflage. München: Bassermann, 1880. Pp. 556.

In this second part of his first volume, Prof. Kuno Fischer follows out the same plan of thorough revision which he set himself in issuing the new edition of his first part, dealing with Descartes and earlier philosophy (MIND XIV., p. 292). There was still more to be done in bringing the account of Spinoza up to date than was necessary in the case of Descartes; so much inquiry having been spent upon

the Jewish thinker since 1862, when the author's second edition appeared. Amongst the additions is chiefly to be noted the exposition (pp. 204-42), made in the author's usual felicitous manner, of the *Tractatus brevis*, not published in full till the year 1862. The author also enters at length into the whole question of the relation of Spinoza to his predecessors, which has been so warmly and variously debated since the publication of the *Tractatus*. Without going as particularly into Joël's evidence as did Mr. Sorley in the last number of MIND, Prof. Kuno Fischer as distinctly rejects the notion of a special influence from the mediæval Jewish thinkers, and he rejects also in turn the different theories of Spinoza's development advanced by Sigwart, Avenarius and others. Against all the later theories alike he maintains his own earlier view that as far as Spinoza was moved to thought by an external impulse, this came from none but Descartes. He now puts the case thus :—

"My notion of the development of Spinoza is that his fundamental views never change but are in the main fixed already in the *Tractatus brevis* (including the *Dialogues*), and that the great difficulties which made his progress slow lay in the elaboration of the geometrical *technique* of his system. In that methodic working out of his doctrine Descartes, if not his model, was yet his guide, and Descartes alone. In his pantheistic principles Spinoza appears as the opponent of Descartes," but as one who was driven to take up the antagonistic position by the very contradictions inherent in the fundamental Cartesian doctrine of substance.

Abriss der philosophischen Grund-Wissenschaften. Von Dr. GUSTAV GLOGAU, Privat-Docent der Philosophie a.d. Universität Zürich. Erster Theil: "Die Form und die Bewegungsgesetze des Geistes". Breslau: Koebner, 1880. Pp. xxii, 397.

This is the first part of a comprehensive philosophical work, dedicated to Prof. Steinthal and inspired by his teaching. The author gives this general survey of his undertaking :—

"We shall in this First Part, after giving a preliminary solution of the opposition of Nature and Mind, (1) trace an ideal cross-section of the development of mind, according to the principles of Folk-psychology, and (2) exhibit at length the inner lawfulness of this development, without however at this stage going into all the separate details of mental activity. Thus we shall get the basis of a general philosophical Doctrine of Categories. A Second Part will begin with the question as to the original certainty and meaning of the word Being and will then, upon this basis of all scientific knowledge, discuss the fundamental notions of the theoretic and æsthetic sciences and ethics with special reference to their mutual relations. Upon this (perhaps in a Third Part) a general view of the universe is to be sought; the position of man, his importance, his tasks, his prospects within the universal life having, above all, to be critically considered. And as all being and thinking is historical and philosophy too is a process of development . . . there is requisite, in conclusion, a historic exposition" of all previous directions of thought bearing on the present.

Die monistische Philosophie. Ihr Wesen, ihre Vergangenheit und Zukunft für die Gebildeten aller Stände dargestellt von LUDWIG A. ROSENTHAL. Berlin: Duncker, 1880. Pp. 140.

An exposition of the history of modern Monistic Philosophy, as first clearly set forth by Spinoza, under the influence of Descartes, and, after the more or less negative attitudes of Leibnitz and Kant, carried forward by Schopenhauer, followed by Geiger and Noiré down to the present day. The author conceives Monism as proclaiming the perfect unity of that which *appears* as Motion to the senses and that which as being the inner Feeling of all phenomena eludes the senses. "The external, the phenomenal, causes no more difficulty, because it presents itself alike to all observers." The real mystery is "that inner motive of all things which some regard as distinct from body, others (the Monists) as inseparably bound up therewith". The author is also specially concerned to mark off from Monism and to estimate the position of Materialism.

Grundzüge der allgemeinen Logik als einer allgemeinen Methodenlehre des theoretischen Denkens. Von Dr. A. DÖRING, Direktor des Gymnasiums zu Dortmund. I. Theil: 'Einleitung u. Naturlehre des theoretischen Denkens'. Dortmund: Köppenische Buchhandlung (Otto Uhlig), 1880. Pp. xii, 168.

The author published a work in 1878, *Ueber den Begriff der Philosophie* (Dortmund), in which he contended that the essence of philosophy consists in the *practical* reference given to human knowledge. He now begins the application of the conception in detail; Theory of Knowledge falling to be taken first and, as preliminary thereto, Logic. The present instalment gives his view of the relation of the two, followed up by the *Naturlehre* or Psychology of Theoretic Thought. The special features of the author's view of Logic are given thus: (1) Complete separation of Thought and Knowledge and exact determination of the nature of those functions of Thought with which Logic has to do; (2) The basing of Evidence or necessity and universality of Thought upon *Zweckgemässheit*; (3) Exposition of the *whole* of Logic as a doctrine of Method; (4) Strict separation of the synthetic and the analytic procedure of theoretic thought; (5) Careful and complete exposition of the *Naturlehre* as foundation of the doctrine of Method.

Studies in Deductive Logic. A Manual for Students. By W. STANLEY JEVONS. London: Macmillan, 1880. Pp. 304.

"This presently *forthcoming* book is intended to promote practical training in logic. About half of the 29 chapters consist of logical questions and problems, partly compiled from the examination-papers of the Universities and leading teachers of logic. Some hundreds of novel questions and problems have, however, been devised by the author specially for this work. The other chapters contain *answered questions*, in which the most frequent errors of students, the chief difficulties of syllogistic reasoning, and the errors of some well-known authors are concisely explained. The ingenious syllogistic cards and cylinder of Mr. Henry Cunningham are incidentally described. 'Equational' and Numerical Logic are pretty fully

treated, and 'The Logical Index' giving all the possible distinct forms of assertion involving any three terms is published for the first time, and its use described. In teaching the relations of propositions the author adopts the nomenclature of M. Delboeuf as described in *MIND* III., p. 425, and insists upon the necessity of a uniform nomenclature in mathematics and logic."

IX.—MISCELLANEOUS.

Mr. Geo. Thomson sends the following:—

"In the last number of *MIND*, p. 438, G. A. in noticing my book, *Evolution and Involution*, says—'So far as we can judge, the Law (of Evolution and Involution) amounts merely to the statement that every being can only understand as much of the universe as it understands, and that the higher animals understand more of it than the lower.' This would be an extraordinary statement indeed. Such an idea never entered my mind; nor can any one explain the Law away to have such a meaningless significance. The Law of Evolution and Involution, I have expresssd in a general way thus: 'The Law of Evolution and Involution is that all beings in proportion as they assume personality and *evolve* out of the universe, in that proportion do they involve it within themselves and incorporate it, approaching at the same time absolutism in all its attributes.' Perhaps my statement is not in the happiest of terms; and if this were the only form in which it was presented in the book, the reader might be excused for not altogether comprehending it; but when the Law is presented in a hundred forms in the pages of the book, and when the Law is explained through the *knowing* attribute in man, I do not well see how any one could misunderstand my meaning.

"One would suppose, observing the order of beings in nature, that the higher any personality is, the more would it *leave* nature. Contrast the flower, the lower animal, and the man. But the higher the personality, instead of *leaving* nature, the more is it necessitated to make the universe itself and incorporate it—so much so that a complete personality (which man is not) would wholly take up the universe and be it. And when I say 'incorporate,' I need not say to the readers of *MIND*, that I do not mean gross with gross. And it is not only that the Law of Evolution and Involution thus exhibits itself in the graded varieties of living beings in nature; but in proportion as they know themselves, in exact proportion are they compelled to know the universe; or, including all the attributes of personality, in proportion as beings *are* themselves, in exact proportion are they under an inexorable necessity to be the universe. The Law of Evolution and Involution thus brings to light the wise and beautiful conservatism of nature. Every inch of freedom or tether that she gives to her children in way of height of personality, in all the graded varieties of visible and living nature, she in the very act of giving has it enacted through all nature that inch for inch by an inexorable necessity they must become herself. This, then, in few words, is a statement of the Law of Evolution and Involution; and I do not know much that is very great that does not hang on it, such as an explanation of the origin of good and evil, of morality, of religion, of the foundation of the ideas of space, of time, of existence, of number, of form, &c.—all which I have endeavoured to explain in the book.

On the 14th of September the statue of Spinoza at the Hague was unveiled by the direction and in the presence of the Spinoza Committee, and handed over to the municipal authorities. Dr. Van Vloten delivered an address for the occasion, which is printed in pamphlet form under the title "Spinoza de blijde boedschapper der mondige menschheid". The statue is the work of M. Frédéric Hexamer of Paris. The Committee afterwards dined together, the members of auxiliary Committees in other countries who were present being invited as their guests.

Mr. Herbert Spencer has added a new Appendix to *First Principles*, in which he deals successively with the hostile criticisms of Professor Tait and Mr. Kirkman, Prof. Cliffe Leslie, Mr. Malcolm Guthrie, Prof. Birks. This Appendix (pp. 24) may be had separately.

Prof. Schaarshmidt of Bonn has paid Prof. Adamson the great compliment of translating into German his Shaw Lectures *On the Philosophy of Kant* (reviewed in MIND XVII.). The translation (Leipzig, E. Koschny, 1880, pp. vii, 167) has been revised by the author, who has added some new notes.

Prof. John Watson, of Queen's University, Kingston, Canada, author of the article on "The Method of Kant" in the present number, will shortly issue a work on Kant's Theory of Knowledge.

Mr. William Minto, M.A., has been appointed by the Crown to the vacant chair of Logic and English in the University of Aberdeen.

The Rev. Alfred W. Momerie, D.Sc., Fellow of St. John's College, Cambridge, has been appointed Professor of Logic and Metaphysics in King's College, London, in succession to the Rev. H. W. Watkins.

The Journal of Speculative Philosophy will no longer appear at St. Louis, where it was founded fourteen years ago, but will henceforth be published by the Messrs. Appleton of New York.

THE JOURNAL OF SPECULATIVE PHILOSOPHY.—Vol. XIV., No. 3. J. H. Stirling—'Criticism of Kant's main Principles'. P. Spence—'Atomic Collision and Non-collision'. 'Kant's Anthropology' (tr.). 'Grimm on Raphael and Michael Angelo' (tr.). Notes and Discussions.

REVUE PHILOSOPHIQUE.—Vme Année, No. 7. E. Beaussire—'Introduction à l'étude du droit naturel'. H. Lachelier—'La théorie de la connaissance de Wundt'. F. Paulhan—'La personnalité'. Notes et Discussions (E. Lavis—'Du déterminisme historique et géographique'). Analyses et Comptes-rendus. Notices bibliographiques. No. 8. É. Debon—'Les localisations psychologiques, du point de vue subjectif et critique'. G. Tarde—'La croyance et le désir : la possibilité de leur mesure'. Th. Ribot—'Les désordres généraux de la mémoire'. Analyses et Comptes-rendus. Rev. des Périod. No. 9. Ch. Bénard—'La théorie du comique dans l'esthétique allemande'. G. Tarde—'La croyance, &c.' (fin). Notes et Documents (A. Binet—'De la fusion des sensations semblables'). D. Delaunay—'Observation pour servir à la psychologie animale'). Analyses et Comptes-rendus (R. Flint, *Antitheistic Theories*, &c.). Rev. des Périod.

LA CRITIQUE PHILOSOPHIQUE.—IXme Année, Nos. 19-32. C. Renouvier—‘Note au sujet de deux articles de la *Revue Philosophique*’ (19); ‘La démocratie et les doctrines déterministes’ (24); ‘La liberté au point de vue de l’observation’ (27, 29). O. Hamelin—‘Qu’est-ce que l’induction?’ (19). J. Milsand—‘L’idéal’ (21, 24); ‘La mythologie en politique’ (29); Anonymous—‘Le terrain du matérialisme suivant la critique de Lange’ (25); ‘En quoi la critique de Lange est restée enchaînée dans le matérialisme’ (30); ‘Le fatalisme de Lange’ (32).

LA FILOSOFIA DELLE SCUOLE ITALIANE.—Vol. XXI. Disp. 3. P. d’Ercole —‘La psicologia positiva di Roberto Ardigo’. F. Bonatelli—‘Truccoli di filosofia: osservazioni di Gerolamo Clario sulla logica del Bain’. T. Mami-ani—‘Sulla psicologia e la critica della conoscenza: seconda lettera al prof. S. Turboglio’. Bibliografia, &c.

ZEITSCHRIFT FÜR PHILOSOPHIE, &c.—Bd. LXXVII. Heft 1. E. Pfleiderer—‘Kantischer Kriticismus u. Englische Philosophie’ (I.). E. Dreher —‘Zum Verständnisse der Sinneswahrnehmungen’ (Schluss). Hassbach—‘Die Beziehungen der Ästhetik Schopenhauers zur platonischen Ästhetik’ (I.). Recensionen (R. Flint, *Antithetical Theories*; B. P. Bowne, *Studies in Theism*; J. Veitch, *Method, &c., of Descartes, &c.*). A. Meinong—‘Zu Herrn Prof. E. Pfleiderer’s Recension meiner *Hume-Studien*’.

VIERTELJAHRSSCHRIFT FÜR VÖLKERPSYCHOLOGIE U. SPRACHWISSENSCHAFT.—Bd. XII., Heft 2. O. Flügel—‘Ueber die Entwicklung der sittlichen Ideen’ (Forts.). Prof. Pott—‘Sprachliche Bezeichnung von Mass u. Zahl in verschiedenen Sprachen’. L. Tobler—‘Zur Philosophie der Geschichte’. O. Weise—‘Zur Charakteristik der Volksetymologie’. K. Himly—‘Einiges ueber Schiffnamen’. Beurtheilungen. Dr. Holzman —‘Zu den Psalmen u. den Rigveda-Hymnen’.

VIERTELJAHRSSCHRIFT FÜR WISSENSCHAFTLICHE PHILOSOPHIE.—Bd. IV. Heft 3. A. Horwitz—‘Zur Lehre von den körperlichen Gemein Gefühlen’. E. Laas—‘Die Causalität des Ich’. A. Spir—‘Drei Grundfragen des Idealismus: III. (Schluss). Von der Natur u. der Einheit des Ich’. Recensionen. Selbstanzeige, &c.

PHILOSOPHISCHE MONATSHEFTE.—Bd. XVI. Heft 3. G. Knauer—‘Seel u. Geist’ (III., IV.). Recensionen. Literaturbericht. Bibliographie, &c. Heft 4, 5. H. Vaihinger—‘Ein bisher unbekannter Aufsatz von Kant über die Freiheit’ (mitgetheilt). F. v. Bärenbach—‘Das anthropologische Grundproblem der Philosophie’. J. Bergmann—‘Die Erkenntnis aus dem praktischen Selbstbewusstsein: Eine Kritik’. A. Horwitz—‘Die psychologische Begründung des Pessimismus’. Recensionen, &c. Heft 6. R. Eucken—‘Untersuchungen zur Geschichte der älteren deutschen Philosophie. III. Des Paracelsus Lehren von der Entwicklung’. Recensionen, &c. Heft 7, 8. Prof. Baumann—‘Adam Smith’s allgemeine Ansichten über Menschen u. menschliche Verhältnisse’. H. Höffling—‘Zur Psychologie der Gefühle’. Recensionen, &c.

Other Books, &c., received: E. Renan, *Hibbert Lectures*, 1880, transl. by C. Beard, London (Williams & Norgate), pp. 213; E. Shirreff, *The Kindergarten: Principles of Fröbel's System and their bearing on the Education of Women*, 2nd Ed., London (Sonnenschein & Allen), pp. 112; D. M., *Scientific Transcendentalism*, London (Williams & Norgate), pp. 113; A. Valdarnini, *Principio Intendimento e Storia della Classificazione delle umane Conoscenze secondo Francesco Bacone*, 2nd Ed., Firenze (Cellini), pp. 272.

